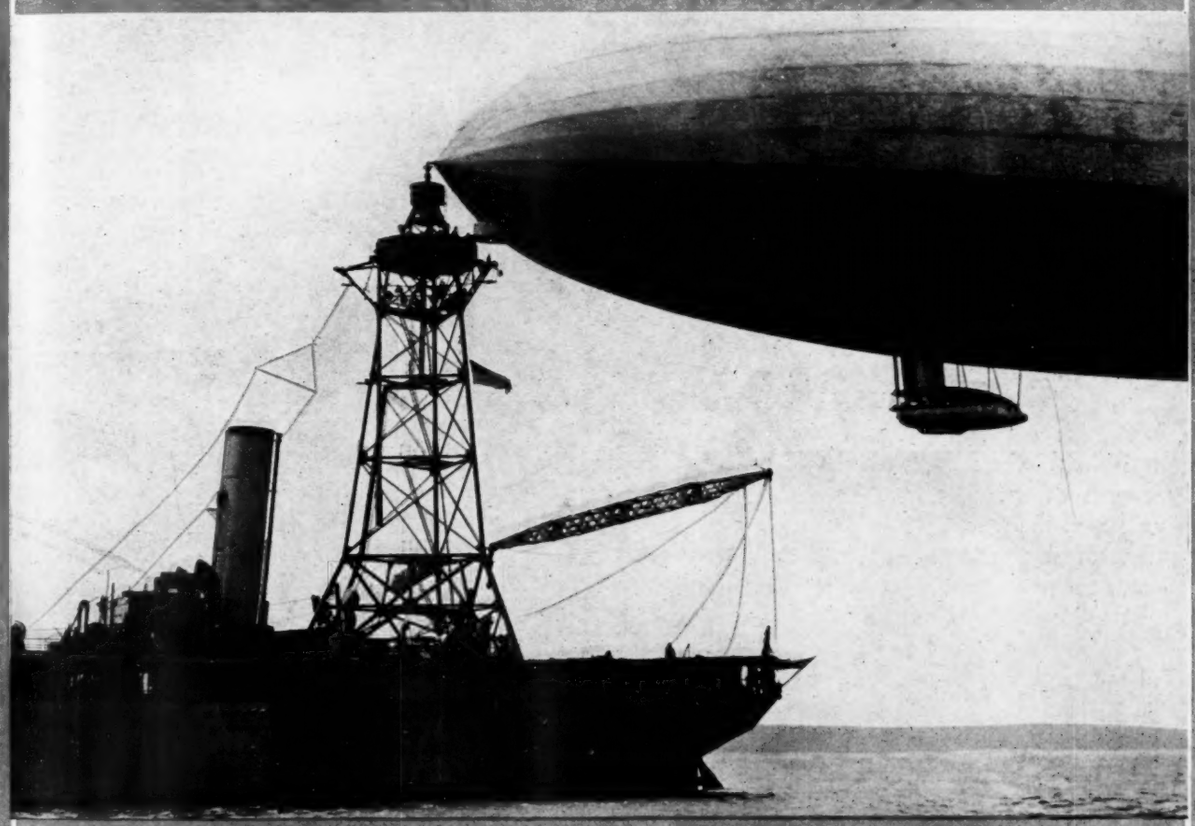
AVIATION

The Oldest American Aeronautical Magazine

AUGUST 25, 1924 **Issued Weekly** **PRICE 10 CENTS**



U. S. Navy Airship Shenandoah moored to the tender Patoka in successful test

P. & A. Photo

VOLUME XVII

NUMBER 8

SPECIAL FEATURES

INDUSTRY, COMMERCE, FINANCE AND THE AIR MAIL

THE PUZZLE OF TRUE RECORDS IN HIGH FLIGHTS

THE NEW ITALIAN "MR" TYPE AIRSHIP

COMMENTS ON A NATIONAL AIR POLICY

GARDNER PUBLISHING CO., INC.

HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office at Highland, N. Y. under Act of March 3, 1879.

Trade Mark

Back of It All

IT is comparatively easy to demonstrate to the layman the remarkable advances being made in the conquest of the air. It is being done every day. Incredible records of speed, altitude flights to the ceiling-of-the-world, fascinating exhibitions of sky-writing, marvelous examples of aerial photography--countless incidents of the most dramatic quality are impressing upon the public the bewildering extent of the airplane's potential utility.

To dramatize the power of engineering which stands back of it all is far more difficult. The infinite pains of manufacturing to micrometer measurements become interesting only in sensational demonstrations of the precision they insure. Since 1909, engineering design and shop practice in the Martin plant have established standards for the industry -- standards of ever increasing perfection.

THE GLENN L. MARTIN COMPANY

CLEVELAND

Builders of Quality Aircraft since 1909

Aeronautical Instruments

LOOK THIS LIST OVER CAREFULLY

Higher prices maybe; lower prices never

The last of the Government surplus instruments. BUY NOW

PART NO.	DESCRIPTION.	PRICE.
2604	Air or gas pressure gauge 0 to 6 lbs.	2.00
2651	Altimeter Tycos 5" luminus face 15000 ft.	3.00
2654	Altimeter Schneider 3" luminus face 25000 ft.	10.00
2611	Banking Indicator Elliot bubble type 0 to 20°	2.00
2621	*Clocks 8-day rim wind luminus face	10.50
2618	Compass Durkee vertical type	15.00
2619	Compass Taylor pocket watch type	1.50
2690	Motor meter Boyce 16 ft. tube 2" non-luminus face	10.00
2692	Motor meter Boyce 40 ft. tube 3" luminus face centigrade	10.00
2693	Motor meter Boyce 20 ft. tube 4" face luminus centigrade	10.00
2644	Tachometer NCR 0 to 2500 RPM luminus dial	10.00
2642	Tachometer Jones 500 to 2500 RPM luminus dial	10.00
2643	Tachometer Johns-Manville 500 to 2500 luminus dial	7.50
2645	Tachometer Jaeger 0 to 1000 RPM luminus dial	5.00
2649	Tachometer Jaeger 0 to 2000 RPM non luminus dial	5.00
2647	Tachometer Jaeger 0 to 2400 RPM luminus dial	7.50
2648	Tachometer Jaeger 0 to 3000 RPM luminus dial	7.50
2667	Shaft and cable to fit above tachometers 28"	2.50
2671	Shaft and cable to fit above tachometers 42"	2.50
2672	*Shaft and cable to fit above tachometers 6 ft.	5.00
2673	*Shaft and cable to fit above tachometers 7½ ft..	6.00
2668	*Shaft and cable to fit above tachometers 9 ft.	7.50
2669	*Shaft and cable to fit above tachometers 10 ft.	8.00
2683	*Adapter to use above shaft on Warner drive, straight	2.50
2681	Adapter to use above shaft on Warner drive, 1 to 2	3.00
2684	*Adapter to use above shaft on Jaeger tachometers	1.50
2630	*Oil gauges 2¾" luminus face 0 to 120 lbs.	4.50
2635	Dixie two magneto switch	4.00
2637	*Berling single magneto switch Aluminum new type	4.00

NOTE: Articles with star (*) are new manufactured stock.

USED INSTRUMENTS

2602	Air gauge 0 to 5 or 10 lbs. 1¾" non-luminus face	1.00
2651	Altimeter Tycos 5" luminus face 0 to 15000 ft.	1.00
2650	Altimeter Taylor 3½" luminus face 0 to 25000 ft.	3.00
2612	Banking indicator Sperry 2¾" face round type	2.00
2696	Air Speed indicator Bristol 40 to 150 MPH	5.00
2697	Air Speed indicator NCR 40 to 160 MPH	5.00
2698	Air Speed indicator Foxoboro 30 to 120 MPH	5.00
2685	Petot head for NCR new	3.50
2686	Venturi tube for Bristol or Foxoboro new	5.00
2687	Venturi tube for Badin French type double throat	1.00
2688	Venturi tube for Jaeger French type single throat	1.00
170	Copper tubing 1/8" 16 ft. lengths per foot	.15
172	Copper tubing ¼" 12 ft. lengths per foot	.15
2615	Compass General Electric vertical Army type	10.00
2618	Compass RAF mark 11	5.00
2657	Tachometer Van Sicklen luminus dial 0 to 2500 RPM	10.00

Write for our complete list of used instruments for experimental work, consisting of gas gauges, tachometers, altimeters, etc.

JOHNSON AIRPLANE & SUPPLY CO.

DAYTON, OHIO

AUGUST 25, 1924

AVIATION

VOL. XVII. NO. 8

Published every Monday

CONTENTS

Editorials	909	Chance Vought Secures Cuban Order	914
Industry, Commerce, Finance and the Air Mail	910	Around the World Flights	914
The Puzzle of True Records in High Flights	912	Light Planes and Gliders	916
The New Italian "Mr" Type Airship	913	Airports and Airways	917
Comments on a National Air Policy	914	U. S. Air Forces	919

GARDNER PUBLISHING COMPANY, Inc., *Publishers*

GENERAL AND EDITORIAL ROOMS: 225 FOURTH AVENUE, NEW YORK

Publication office

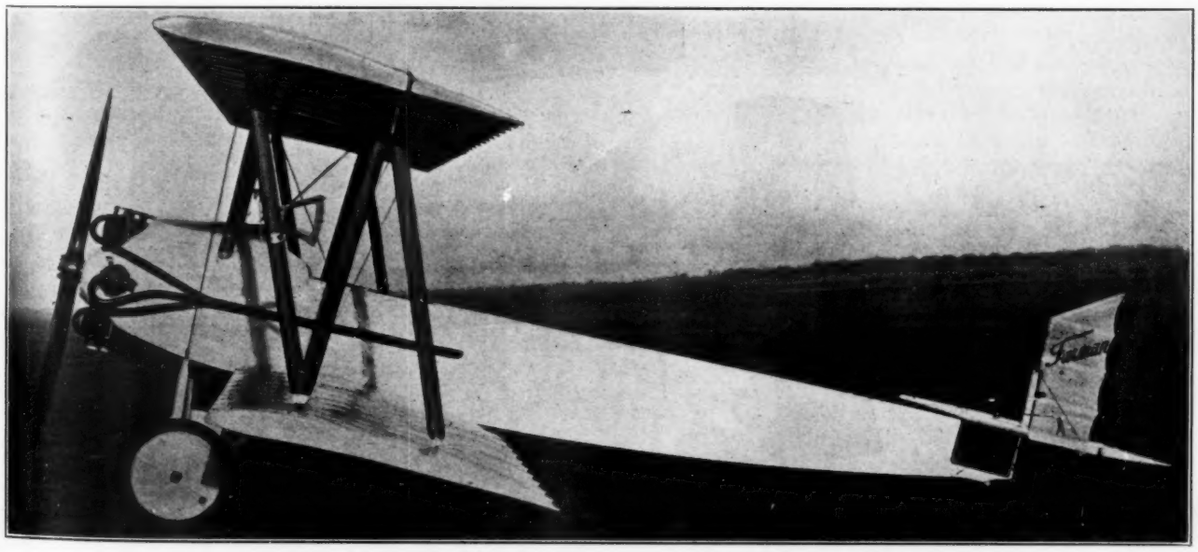
HIGHLAND, N. Y.

Subscription price: Four dollars per year. Single copies ten cents. Canada, five dollars. Foreign, six dollars a year. Copyright 1924, by the Gardner Publishing Company.

Issued every Monday. Forms close ten days previously. Entered as second-class matter Nov. 22, 1920, at the Post Office at Highland, N. Y., under act of March 3, 1879.

FARMAN

SPORT PLANES



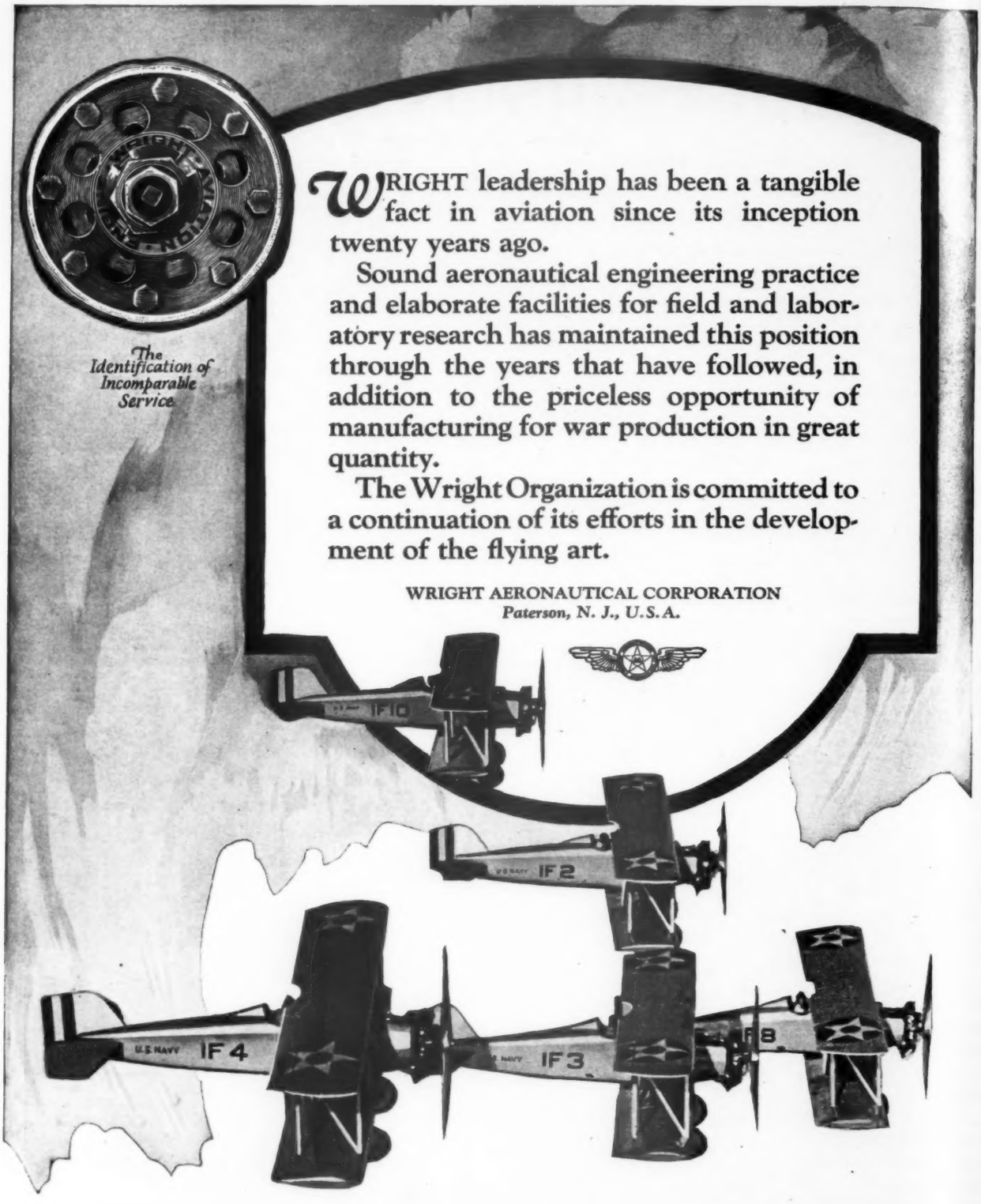
FOR THE PILOT OR SPORTSMAN WHO WISHES THE BEST

Imported from France, where they are built to your order in the Largest Aircraft Factory in the World.

1924 MODELS $4850.00 UP, DELIVERED PHILADELPHIA

WALLACE KELLETT CO. INC.

ATLANTIC BUILDING PHILADELPHIA, PENNA.


WRIGHT
The Identification of Incomparable Service
WRIGHT leadership has been a tangible fact in aviation since its inception twenty years ago.
Sound aeronautical engineering practice and elaborate facilities for field and laboratory research has maintained this position through the years that have followed, in addition to the priceless opportunity of manufacturing for war production in great quantity.
The Wright Organization is committed to a continuation of its efforts in the development of the flying art.
WRIGHT AERONAUTICAL CORPORATION
Paterson, N. J., U.S.A.
IF10
IF2
U.S. NAVY IF 4
IF3
IF8

WRIGHT AIRCRAFT AND ENGINES

L. D. GARDNER
PRESIDENT

L. D. WEBSTER
TREASURER

GEORGE NEWBOLD
BUSINESS MANAGER

AVIATION

LADISLAS D'ORCY
EDITOR

VIRGINIUS E. CLARK
EDWARD P. WARNER
RALPH H. UPSON
EDMUND T. ALLEN
CONTRIBUTING EDITORS

VOL. XVII AUGUST 25, 1924 No. 8

The Shenandoah at Sea

THE glistening form of the Shenandoah sailing majestically overhead is a thrilling sight to airman and layman alike. The press of the country has featured every flight of the Shenandoah, a sure indication of the public's interest.

But arousing the interest of the public is not the true mission of the giant dirigible. Our naval authorities showed their appreciation of this fact when they decided to cancel the airship's tour of the middle west states.

As frequently emphasized in AVIATION, the true mission of the ship is with the fleet and the sea tests which are now under way must continue for a long time. Not only must the uses and limitations of the ship be studied but the officers of the Navy must learn to avail themselves of the information which the ship can furnish them.

The mooring of the Shenandoah to the mast of the supply ship Patoka showed that under favorable conditions the dirigible could be refueled in distant harbors and stay away from its hangar for an indefinite time. While this knowledge is of great importance there is still to be learned the practicability of refueling at sea under adverse conditions.

From a commercial point of view, a great step in advance was made when, during a 1,300 mile cruise, the ship did not have to valve any helium.

From the military viewpoint the long cruise of the dirigible in search of "enemy" vessels was not as conclusive. One of the "enemy" vessels was found and, according to press accounts was "destroyed," but there has been no official report on the subject and no scout planes were sent up from the "enemy" vessel.

During the war the Zeppelins did a considerable amount of reconnoitering over the North sea but the distance from shore prevented anything but heavy seaplanes from attacking them and these they always eluded. With the development of the catapult and the fast climbing scout the situation may have changed.

The tactical uses of the different units of the fleet and their coordination were not learned in a day and it is to be hoped that the Navy will stick to its present plan of giving this new weapon the fullest chance to demonstrate its uses under service conditions.

The Approach of Profitable Aviation

ON July 25, 1909, Louis Bleriot made the first flight across the English Channel. He used a Bleriot type X1 monoplane fitted with a 25 hp. Anzani three cylinder engine. The crossing occupied nearly an hour and on his arrival on the English side M. Bleriot had to fly along the cliffs to find a gap as he was unable to climb high enough to get over the high spots. On landing he crashed and broke the undercarriage.

During the week which marked the fifteenth anniversary of the flight the commercial lines which link Great Britain with the continent for the first time in their history carried over one thousand passengers across the channel. This coincidence brings out in convincing fashion the progress which has been going on in aviation. The routes from London to the near by continental cities are too short to show off the airplane to the best advantage and the foggy weather is a great handicap so that the lines have often been treated in the light of an experimental venture with a political motive behind them. Gradually and in spite of various setbacks the lines seem to be gaining in patronage and though they are by no means as yet on a paying basis there are indications that they will ultimately become so.

The Constructor's Commercial Opportunity

THE sale of surplus war material at salvage prices during the past few years has produced in this country a variety of commercial aviation which is peculiar to the United States. While there are no large companies operating aircraft there is probably more civilian flying here than in any other country. The field exploited by the small operating companies and individual pilots has won a real economic standing in America and there is now little doubt of its expansion along the lines of present development. However, the supply of the equipment is gradually being exhausted.

Within a few years, three or four at the most, all the old war surplus machines will be either worn out or unfit for flying. It takes several years to develop a new type of plane that is superior to the older types and as long again to popularize it. There is every indication that there will be a need for modern civilian equipment considerably before such equipment is ready for use.

The time is ripe for a careful study of commercial aviation as it has developed so far in the U.S.A., and for the construction of machines which will fill the need. Air transportation will come ultimately, but the field filled by the local flier exists already and he will soon be forced to buy new equipment.

Europe has developed many machines along the general commercial type, but history will probably repeat itself and, as in the case of the automobile, foreign machines will not fill the specialized needs of America. The opportunity is at hand. It will be interesting to see who is farsighted enough to grasp it.

Industry, Commerce, Finance and the Air Mail

By COL. PAUL HENDERSON

Second Assistant Postmaster General

In brief, here is the history of how the Post Office Department has endeavored to meet the constantly increasing demand for greater speed in the transportation, of mail across the continent:

1850—Three days by rail; 21 days by stage coach.

1860—Two and one-half days by rail from New York to St. Joseph, Mo.. and 8 days by Pony Express.

1876—One hundred hours by special train.

1923—Ninety-six to 120 hr. by ordinary mail train, depending upon connections.

1924—Air Mail, an average elapsed time of 33 hr. from New York to San Francisco and vice versa.

Whatever your business activity may be, whether manufacturing, distributing, jobbing, mercantile, banking—the Air Mail can serve you in ways which must be at once apparent upon consideration of the following facts:

Mail planes are now operated upon exactly the same sound transportation principles as govern and are responsible for the unparalleled success of the American Railway system.

The planes operate upon schedule. While their great contribution is speed, this astonishing speed is not emphasized to the distortion of other essential elements.

Mail planes are not simply rushed from Coast to Coast, undue haste being conducive to confusion; but they are started at certain hours, are required to report at Division points and depart from these points at certain hours.

While the service of which you have read so much in the daily press operates, as an air line, for the 2680 mi. from the Atlantic to the Pacific Ocean, schedules are so coordinated with railway mail service that cities from 500 to 1000 mi. north or south of the route of flight may avail themselves of the acceleration which these planes provide.

The First Airway

A word first as to what aviation is. What do you, as business men, know about flying? You know that an American was the first to invent and fly a practical airplane. You know that, during the World War, countless thousands of airplanes were produced by our own country to do their part in winning the war. But have you not, to some extent at least, conceived of aircraft as military weapons, indispensable as a means for national security, but pretty expensive at that? It is the proud record of the United States Post Office Department that it was not only the first Governmental agency anywhere in the world to put aircraft to economic use, but actually the first to prove to the world that the primary function of flying is to serve humanity—to make business more prosperous and life more pleasurable.

On May 15, 1918, when the whole world was thinking only of dropping bombs from airplanes, or shooting machine guns from them into the trenches, or spraying noxious gases from their tails upon non-combatants, the American Post Office Department established an experimental Air Mail Service between New York and Washington. Out of this experiment, grew, by degrees, the system of daylight flights between New York and Cleveland, Cleveland and Chicago, Chicago and Omaha, Omaha and Cheyenne, Cheyenne and Salt Lake City, Salt Lake City and San Francisco. We proved that we could fly regularly and with gradually decreasing expense. We found that mails and human life had far greater security in the air than any aviation branch had yet demonstrated, but still we were not satisfied, for what we were providing was a laboratory demonstration, for the benefit of the nation at large, yet not practicable, so far as everyday business was concerned.

What was wrong? You can answer this. Suppose our railways operated only by day? Suppose there were no sleeping cars or no through connections for long journeys? Well, we proposed, in the Post Office Department, to ascertain whether it was possible for aircraft to fly by night. Hitherto it had only been done by military fliers, under pressure of war, and when we announced our plans some of our best friends cautioned us against it as being impracticable. You may remember, in August, 1923, we flew experimentally for four days and nights from Coast to Coast, over a lighted airway extending almost a thousand miles from Chicago to Cheyenne. The interest which this aroused among business men, and the impression which it made, as a national inspiration, among members of Congress, resulted in our being authorized and provided with sufficient funds to operate the air line from Coast to Coast, day and night, winter and summer, rain or shine, upon a seven-day-a-week basis. This is what we are now doing.

What the Service Offers

In other words, to quote from a speech which the Postmaster General recently made, we are 'Putting Aircraft to Work.' Briefly, what we offer you is this: We will carry mail for you from New York to San Francisco in 34 hr. 45 min., elapsed time. We will carry it eastward between oceans in 32 hr. 5 min., the difference being accounted for by favorable winds.

We will accept mail from any part of the United States to any part of the United States if, in its journey, it can be accelerated by moving by 300 mi. or more by air.

We will accept mail of any character and any size or weight that comes within the parcel post regulations.

Army fliers who at great personal risk photographed the active Hawaiian volcano Kilauea. Left, Lieut. Roscoe C. Wriston, and Sergeant Richard L. Agnew

We will charge you 8 cents an ounce or fraction thereof for each Air Mail zone or part of zone traversed. This charge also includes the ordinary postage for the transportation of your mail from or to points off the line of flight.

Our zones are three in number. They extend from New York to Chicago; Chicago to Cheyenne and from Cheyenne to San Francisco. All you have to do is to see that the proper amount of Air Mail Postage is affixed to your mail. Your postmaster will do the rest. He has pledged his cooperation to expedite your mail to the nearest connecting point (if you are off the air mail line) and the Railway Mail Service, with its characteristic initiative and devotion to duty, will see that it gets every attention.

You don't need to buy the 8c, 16c or 24c postage stamps issued especially for the Air Mail. You can use ordinary postage to the required amount. Registered mail will be accepted. The fact that in the last two years, 360,000 lb. of mail have been carried by air and only 120 lb. destroyed is proof of the comparatively high degree of safety.

The slogan of the Air Mail is Speed—speed not only in the air but in collections from the street box, sorting in the postoffice, motor transfer to the flying field, transfer to train or terminal postoffice and speed to the carrier. If you desire, you may insure immediate delivery by affixing a special delivery stamp.

The Summer Schedule

These are the facts. Appended is our summer schedule. If you live in any city along the line of flight, these figures are sufficient. If you live in the great belt extending 500 to 1000 mi. north or south of the line, see your postmaster. He knows what you can do to save time.

SUMMER SCHEDULE

WEST

LEAVE				*ARRIVE*			
New York	10.00	A.M.	E.T.	Bellefonte	12.20	P.M.	E.T.
Bellfonte	12.40	P.M.	E.T.	Cleveland	2.55	P.M.	E.T.
Cleveland	3.10	P.M.	E.T.	Bryan	3.55	P.M.	C.T.
Bryan	4.15	P.M.	C.T.	Chicago	6.15	P.M.	C.T.
Chicago	6.30	P.M.	C.T.	Iowa City	9.00	P.M.	C.T.
Iowa City	9.20	P.M.	C.T.	Omaha	12.05	A.M.	C.T.
Omaha	12.20	A.M.	C.T.	North Platte	3.15	A.M.	C.T.
North Platte	2.35	A.M.	M.T.	Cheyenne	5.10	A.M.	M.T.
Cheyenne	5.25	A.M.	M.T.	Rawlins	7.10	A.M.	M.T.
Rawlins	7.30	A.M.	M.T.	Rock Springs	9.00	A.M.	M.T.
Rock Springs	9.15	A.M.	M.T.	Salt Lake City	11.05	A.M.	M.T.
Salt Lake City	10.20	A.M.	P.T.	Elko	12.35	P.M.	P.T.
Elko	12.50	P.M.	P.T.	Reno	3.30	P.M.	P.T.
Reno	3.45	P.M.	P.T.	San Francisco	5.45	P.M.	P.T.

34 Hours-45 Minutes

EAST

LEAVE				*ARRIVE*			
San Francisco	6.00	A.M.	P.T.	Reno	8.00	A.M.	P.T.
Reno	8.15	A.M.	P.T.	Elko	10.45	A.M.	P.T.
Elko	11.00	A.M.	P.T.	Salt Lake City	1.00	P.M.	P.T.
Salt Lake City	2.15	P.M.	M.T.	Rock Springs	4.00	P.M.	M.T.
Rock Spring	4.15	P.M.	M.T.	Cheyenne	7.00	P.M.	M.T.
Cheyenne	7.15	P.M.	M.T.	North Platte	9.45	P.M.	M.T.
North Platte	11.05	P.M.	C.T.	Omaha	1.50	A.M.	C.T.
Omaha	2.05	A.M.	C.T.	Iowa City	4.50	A.M.	C.T.
Iowa City	5.10	A.M.	C.T.	Chicago	7.20	A.M.	C.T.
Chicago	7.35	A.M.	C.T.	Bryan	9.25	A.M.	C.T.
Bryan	9.45	A.M.	C.T.	Cleveland	12.20	P.M.	E.T.
Cleveland	12.35	P.M.	E.T.	Bellefonte	2.35	P.M.	E.T.
Bellefonte	2.55	P.M.	E.T.	New York	5.05	P.M.	E.T.

32 Hours-5 Minutes

The service is yours to patronize. It is presented as a business proposition, though naturally it has an intense patriotic appeal. But the Air Mail, being put to work for you, can develop and expand only to the degree in wiheh you visualize its remarkable contribution to business efficiency and patronize it accordingly.

Book Review

MAKING THE WEATHER. By Prof. Alexander McAdie, MacMillan Co., New York.

While this book of 87 pages deals mainly with the influence of the weather on such historical events as Napoleon's Retreat from Moscow, the loss of Lord Kitchener, the Battle of Jutland and the Zeppelin attacks on England, there is much of especial interest to the air man.

In the chapter "Wanted! Warming Pans," Professor McAdie shows how the Zeppelins failed in their mission largely on account of the absence of adequate heating apparatus. He states "as shown later in the surrender of the ships it was plain that the officers and men were in a dazed condition and their feet cold.

"Historians seem to have lost sight of the significance of this effort of Germany to develop a deadly third arm of her offensive. Its importance is not yet clearly grasped by those who write critically of military operations during the last war because the fiasco of the home trip completely belittled the results.

"Why did the raid fail? Adverse wind and dense mist (meaning fog) are the causes officially assigned; but perhaps some mention should be made of the fact that, while champagne bottles were present, warming pans were absent. Probably if the throats had been less thirsty, the woeful exhibit of chilled extremities which came later might have been avoided."

In writing of the disastrous effect of the fog at the Battle of Jutland a prophetic paragraph is added:

"And with Jutland the long line of sea fights from Salamis to the Sea of Japan ends. Ichabod! Ichabod! Thy glory has departed. Henceforth the ships of the sky shall play the leading role, and the nation holding the mastery of the air will have in its palm the power to make or mar. But even though the fleets may clash above the mists and fogs of old ocean, the clouds will still intervene; and as of yore victory may hang on visibility."

The book is written in a readable style and contains the interpretation of events from the point of view of a philosophical meteorologist or better still a very human statement of the weather.

Official Seaplane Records

New American records for seaplanes, established in accordance with F.A.I. Regulations, have been officially recognized by the Contest Committee of the National Aeronautic Association as follows:

CLASS C1, SEAPLANES

Duration: Lts. F. W. Wead and J. D. Price, U.S.N., Navy CS2 seaplane, Wright 585 hp., at Washington, D. C., July 11-12, 1924. 14 hr. 53 min. 44.2 sec.

Distance: Lts. F. W. Wead and J. D. Price, U.S.N., Navy CS2 seaplane, Wright 585 hp., at Washington, D. C., July 11-12, 1924. 1600 km., 994.19 mi.

Since the above American records exceed the present World records in these respective categories, the Directing Official's reports and other documents have been forwarded to the International Aeronautic Federation with a request that the performances be duly homologated as new World Records.

Pioneer Co. Provides for Future

In order to be in a position to quickly increase their productive capacity in case of necessity, the Pioneer Instrument Company has made arrangements with the occupants of the factory at 758-770 Lexington Ave., Brooklyn, N. Y., (adjoining the present Pioneer plant) whereby their premises will be turned over to the Pioneer Company in case of national emergency.

The factory thus made available for aircraft instrument work in case of need is now occupied by manufacturers of locks and small hardware and includes a complete brass and bronze foundry as well as machine and assembly departments. The building, which is unusually light and well adapted for instrument work, contains about three times the area of the present Pioneer plant, thereby providing for the quadrupling of the Pioneer Company's capacity.

To secure these added facilities in case of emergency it has been necessary for the Pioneer Company to obligate itself to take over certain areas of the new plant at intervals whether required or not, the arrangements providing for the eventual occupancy of the entire building.

Charles H. Colvin, General Manager of the Pioneer Company, states that the amount of business now on the books or indicated by the announced programs of the government air services, does not warrant any increase in their plant or equipment, but that the obligations covering the progressive increase in plant area have been undertaken as unavoidable elements of the general agreement giving them control of the new plant in case rapid expansion is required by government needs.

The Puzzle of True Records in High Flights

By ALEXANDER McADIE

Director, Blue Hill Observatory

One will read in the press that this or that airman had tried to break the record for altitude; and that a height of 40,000 ft. was indicated by the altimeters. Then some weeks later, perhaps a month, one reads that the F.A.I. (Fédération Aéronautique Internationale has homologated the results; and it appears that instead of 40,000 ft. the airman only reached 35,000 ft., and so failed to break the record.

Unsatisfactory Explanation

It is a puzzle to the layman why there should be so great a difference and why it should take so long to find out what the true height was. Nor are the explanations which are sometimes offered, altogether satisfactory and easy to follow.

Thus in the *New York Times* of Feb. 23, 1924, in commenting on Lieutenant Macready's failure to break the altitude record of 36,555 ft. held by Sadi Lecointe, it is stated:

"When the air is cold the atmosphere becomes contracted to such an extent that there is less than the usual amount of air at great heights. Winter, especially cold winter weather, when the pressure is not high at the ground is thus not a favorable time to break altitude records.

"Warm summer weather, when the surface pressure is high, especially in late summer when the layers of air to great heights have reached their maximum upward expansion, offers the greatest air density far aloft and therefore the best chance of breaking an altitude record."

Now I confess that although I have some knowledge of atmospheric conditions, this explanation does not mean much to me; and as I have had some experience in checking up the records of Schroeder, Rohlfs, Macready and others, I venture to try to put the case in a simpler manner, one which I trust will be helpful to readers of AVIATION.

No Instrument With Correct Height

First: If we could measure the density of the air directly we could devise an instrument which would give approximately correct heights. We have no such instrument.

Second: The instrument we do use is an altimeter, or aneroid barometer with a face giving meters or feet corresponding to centimeters or inches of mercury in vacuo.

Third: An altimeter measures pressure decrease; and while there is a law connecting elevation and decrease in pressure, the relation is rather involved.

Fourth: The trouble is not, as often explained, connected with warm or cold conditions or high or low pressure, but arises from the fact that the altimeter, no matter how good, is a single track kind of instrument, accurate only at a given temperature, namely 1037.

Fifth: Do not be startled by 1037. It is a new temperature scale and a good one. Not 1037 *degrees*, but just plain 1037, for degrees belong to angular measurement and have no standing now on thermometric scales. It is becoming fashionable among leading writers in meteorology, and will doubtless be adopted by physicists and chemists, to speak of 283 Absolute Centigrade or 10 Centigrade or 50 Fahrenheit.

Thermometer Scales

Sixth: All thermometer scales depend on where you start; that is, where you place the zero, or total absence of heat. On the old Fahrenheit scale this is —459; or adding 32, the absolute zero is 491 graduations below the freezing point of pure water. On the Centigrade scale there are 273 scale divisions below freezing. Why? Because the thermal coefficient of the expansion of a gas at constant pressure is 0.00366.

Now there is no reason why we should not make this expansion coefficient 0.001 and change the thermometer scale divisions, so that instead of 273 or 491 between no heat and the heat in water just freezing, we would have 1000. On this basis 1037 is the temperature at which all altimeters are standardized, or if you prefer the old systems which are as unscientific as the inch, the foot and the pound—altimeters are only usable at a temperature of 50 deg. Fah. or 10 deg. C. Hence if the mean temperature of the *column of air* from the ground to the ceiling which the airman reaches, is warmer than 1037, the air column like a pillar of iron has expanded and correction must be made. If above 1037, add; if below 1037, substract.

Seventh: Let us try an example. Major Schroeder on Feb. 27, 1920, broke all records to that date. The isothermal altitude after instrumental errors had been allowed for (the barographs being tested before the ascent, then sealed, and again tested after the flight) was:—

Ceiling reading 257 kilobars (7.48 in. = 11,479 m.)	(37,661 ft.)	
correction for variation in pressure at ground during the flight interval =	128 "	(420 ")
or	11,351 m.	(37,241 ft.)

But the mean temperature of the air was 893 (—29.2 deg. C) and this means that the column of air is short 1633 m. (5359 ft.) and therefore

11,351 m.	(37,241 ft.)
–1,633 "	(–5,359 ")
or 9,718 m.	(31,882 ft.)

Correction of Records

Corrections for vapor pressure, changes in gravity due to altitude, and to latitude amount to 32 m., hence

	9,718 m.	31,882 ft.
	32 "	105 "
	9,686 "	31,777 "
McCookField....	229 "	750 "
	9,915 "	32,527 "

which is considerably less than the altitude taken from the uncorrected altimeter reading.

Eighth: In much the same way, but with more detail, the Lecointe and Macready records have been scaled down and altimeter readings of 12,000 m. (40,000 ft.) reduced to 10,722 m. (35,178 ft.) for Lecointe, Sept. 8, 1923; and 10,518 m. (34,509 ft.) for Macready, Sept. 28, 1921.

Ninth: At this height (6.5 mi.) airmen are above the clouds. There is practically no water vapor and any prolonged stay at such heights would *dry out* both man and machine, a small but important detail which I think has been overlooked in discussion of high level effects.

Tenth: More important perhaps is the fact that airmen have thus penetrated the troposphere and are now in the stratosphere, the region (sometimes called isothermal) where temperature no longer falls with elevation. The density is about 0.36 kilograms per cubic meter, while sea-level is 1.27. The pressure is 240 kbs. (180 mm. or 7 in. of mercury) while at sea-level it is 1013 kbs. (or 760 mm. or 29.92 in.). The temperature in winter is 790, in summer 820; with corresponding ground values of 1000 and 1054.

Hence the airman in winter has a much larger correction subtracted from his altimeter reading than in summer; and even if the same altimeter read the same, he would still be shy about 520 m. (1700 ft.))

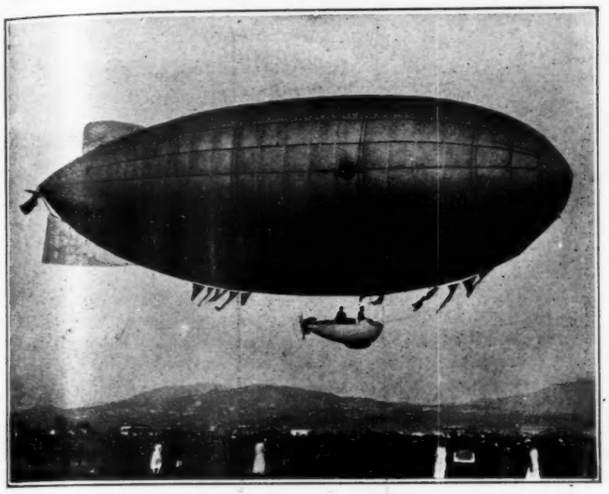
Army Wants Air Transport Planes

On July 26, the Army Air Service asked for bids, to be presented not later than Aug. 27, for building nine transport airplanes.

The planes are to be powered with Liberty motors. They are to carry six passengers, a crew of two, 850 lb. of fuel and 324 lb. of miscellaneous load. The ground speed must be 100 mi./hr. and the climb 600 ft. per min., with a service ceiling of 10,000 ft.

The New Italian "Mr" Type Airship

The "Mr" is the smallest semi-rigid airship in the world. Up to the present, it was generally believed that only non-rigid airships could be produced in very small volumes; in 1917 prominent technicians had affirmed that it was impossible to construct a semi-rigid of 2600 cu. m. (about 90,000 cu. ft.) capacity. The Aeronautical Engineering and Construction Division of the Italian Air Force proved the erroneousness of such a statement for the first time in 1921, when it produced in the government airship factory the SCA type airship, designed by Engineer Nobile, the volume of which was 1,520 cu. m. 53,650 cu. ft.) Recently this record has been surpassed with



The smallest semirigid in the world—The new Italian airship Mr on her trial flight

the construction of the "Mr" semi-rigid, equally designed by Engineer Nobile, the actual volume of which is less than 1000 cu. m. (35,000 cu. ft.)

Due to the extremely small dimensions of this ship, the difficulties of construction were innumerable. It is a well known fact that the percentage of useful load of an airship decreases in proportion as the volume decreases, and that a limit exists where the airship can no longer lift even its own weight. For this reason the "Mr" must be considered as a triumph of Italian constructive technique.

The "Mr" has an actual capacity of 960 cu. m. (33,888 cu. ft.) and carries an average useful load of 450 kg. (990 lb., that is, 42.5 per cent of the total lifting force, while the smallest non-rigid ship in the world, the French "Zodiac," which has a volume of 1000 cu. m. (35,300 cu. ft.) carries a useful load of only 260 kg. (572 lb.) that is, less than 24 per cent. Furthermore, while the maximum speed of this French airship does not exceed 60 km./hr. (37.28 mi./hr.)) the new Italian ship will normally fly at 65 km./hr. (40.38 mi./hr.), and will perhaps even exceed this speed. These figures are especially interesting and instructive. The results obtained in the first test flights were most satisfactory.

Utility of the New Ship

Aside from experimental purposes, the new airship may be usefully employed for scouting within a certain radius of action; its base may be either on land or on a mothership. For scouting purposes, its very small dimensions are not a disadvantage, in that they permit the radius of action to be increased rather than decreased; in fact, its minimum bulk and the very limited means necessary for upkeep and operation greatly facilitate transportation from one point to another, which may be effected even with motor-trucks. If the airship has its base on a mothership, its operation is much more simple.

In this respect, it is of interest to learn that the Spanish Navy has effectively employed the two SCA airships (53,650 cu. ft.), built in Italy by the Lighter-than-Air Construction Establishment, in the Moroccan operations, housing them in motherships. This fact was not generally known, but demonstrates the full importance of small scout airships.

In view of the fact that the "Mr" is less than two-thirds the volume of the SCA, its employment is even easier.

Construction Details

From the constructional viewpoint, the new airship represents a marked progress. The triangular keel, running along the entire length of the gas bag, has only two articulated joints, and is much more rigid, in consequence, than on all previous Italian semi-rigid types.

The nose stiffening is substantially of the type adopted in the OS and PM types, and consists of a system of steel tube rings connected by a number of suitably shaped steel tubes running along the meridians of the envelope. Its resistance is calculated to permit navigation also when the gas bag is in a condition of depression.

Unlike in other Italian airships, the air valve of the compensation chamber is not located at the extreme prow of the ship, but somewhat lower, in the front part of the keel. It is of very simple construction and very light. Another special valve has been fitted for releasing the air; this valve may be operated by the pilot, but normally functions automatically.

The empennage is of cruciform type. It is supported by the triangular keel in such a manner that it is practically independent of the envelope. Thus the maneuverability of the airship is insured even in case the stern compartment of the gas chamber should be in strong depression.

The gas chamber is divided into five compartments by means of four transversal diaphragms. The bag is of two-ply rubberized cotton fabric, aluminum covered.

The car is suspended to the keel by means of steel cables; the pilot may control both the direction organs and the engine. Consequently, the airship may be operated by only one man. It is equipped with one 40 hp., six cylinder, Anzani radial engine, which has a fuel consumption of about 12 kg. (26.4 lb.) per hour. The propeller is reversible by means of a clutch, so that landings may be effected in a very small space. The Anzani engine will be substituted, in the near future, by some power plant of greater reliability and lower fuel consumption.

The airship is fitted with particular devices, designed by Engineer Nobile, permitting landing without the aid of special squads on the field.

Three gasoline tanks (295 lb. aggregate capacity), two tanks for water ballast (265 lb. agregate capacity) and other accessories are contained in the triangular stiffening keel.

Dimensions

The following are the principal dimensions of the airship: Total length: 32 m. (104.98 ft.); Average diameter: 7.78 m. (25.51 ft.)

The average useful load is 450 kg. (990 lb.); however, in winter, it may be increased to 550 kg. (1100 lb.).

In the last-mentioned condition, and with only one man on board, the maximum endurance of the airship would reach 25 flying hours, the corresponding distance covered being 1500 km. (930 mi.). The ceiling of the ship is 3000 m. (9,840 ft.). In practice, however, the endurance is much smaller, for the engine used could not withstand such a prolonged effort.

The airship was designed and built within six months, and the work of assembling and inflating broke all previous records, for only three days were required with a squad of ten men.

The airship made its maiden flight on June 5, 1924, carrying a crew of three. On June 7, it was christened and went up with General Guidoni, Chief of the Aeronautical Engineering Corps, on board. In subsequent test flights it was ascertained that the ship is very maneuverable and readily obeys the controls. Its stability is particularly notable and it was possible to abandon the controls without the ship changing direction or assuming any inclination.

Comments on A National Air Policy

Importance of the Suggested Points Shown by Letters

The Suggested National Air Policy which has been printed in AVIATION for the last month has prompted many persons to send letters of helpful comment. The most interesting as well as important impression created by these comments is that the national air policy as outlined appears to have embodied in it the points on which there seems to be very general agreement. Intentionally, controversial subjects or those which would meet with great objection were excluded as far as possible. Suggestions that a cabinet officer should be in charge of all the aerial activities of the government; that there should be a single air force, and others which appear to be remote in their accomplishment, have been withheld from the plan so that a general agreement could be had on certain fundamental requirements of this country for furthering air development.

Col. J. G. Vincent

A typical letter was received from Col. J. G. Vincent, Vice President of Engineering of the Packard Motor Car Company, who during the War developed, with Mr. Hall, the Liberty engine, and since the War has done some of the most important aircraft engine development work in the world. His letter follows:

"I have read the suggested National Air Policy with a great deal of interest and have no criticisms or suggestions to make.

"The suggested policy probably is not perfect but I believe that it is as near perfect as it would be possible to get it without actual experience. Any policy could naturally be improved from year to year, but the important thing is to get started on some policy that is along the right general lines.

"As stated above, I have no criticisms or suggestions to make and I thoroughly approve the suggested policy as a good start."

Grover Loening

A letter from Grover Loening, one of the leading aeronautical engineers in the world, an airplane builder for many years and author of many books and articles on aviation, gives the constructor's suggestions as to procurement and experimental methods of the government. He writes:

"We agree with every suggestion that you make, excepting the coordination of procurement and experimental air craft under one agency. The British are in a helpless state, due to having done this. It would absolutely stifle the industry, and would eliminate the great incentive of competition which, I think is responsible for the remarkable leadership in design and construction in this country. Instead of coordinating this work, I think we may look forward to the time when other departments of the Government, such as the Ordnance Department, and the Chemical Warfare Service, will purchase their own airplanes exactly as they now purchase their own motor trucks.

"What we should coordinate into one branch, is the experimental development department of the Government. In other words, McCook Field, and the Naval Aircraft Factory could economically be combined with National Advisory Committee work, but there is great danger in combining all procurement under one head. I would therefore urge that you eliminate this from your recommendation, and quite the contrary, urge that the airplane must be recognized as a general useful vehicle with a wide scope of application in all branches of the government service, exactly as in an automobile or motor truck.

"On the development of commercial aircraft, I think that the air mail proves the quickest way to do this; that is, to have neither private enterprise nor government subsidy, but to have a definitely government operated, government owned series of air lines run like the air mail."

Godfrey L. Cabot

Godfrey L. Cabot who, as well as being one of the leading manufacturers in the United States, took up flying before the War and at the age of fifty-six became a naval aircraft pilot during the War, and since then has been active in the affairs of the National Aeronautic Association, writes giving some suggestions as to the development of the points mentioned in the suggested National Air Policy. His valued opinion follows:

"It seems to me that the two things most needed for aeronautical development in this country are:

"First, a federal law so regulating the air traffic as to insure

"(a) Competent pilots.

"(b) Revoking of the license of any pilot who has failed from time to time to pass prescribed tests or given other evidence of incompetency or carelessness.

"(c) Dependable airplanes, subject to periodic inspection by competent officials and to severe penalties for the use of unsafe machines.

"(d) Traffic regulation, such for instance, as has been accomplished by our Massachusetts statute.

"The second important matter is an extension of the air mail route.

"The third important matter is an increase in appropriations for the Army and Navy. In my judgment, the control of the aeronautical branches of the Army and Navy is now in very excellent hands and much larger sums might be safely placed at the disposal of these excellent officers with the full assurance that good value would be obtained by the American people.

"I thank you for giving me this opportunity of publicly expressing my thoughts on this matter in which all patriotic citizens should be deeply interested."

Col. B. F. Castle

Col. B. F. Castle, who resigned from the regular army after a distinguished career and is now a New York banker, writes, making several very definite suggested changes. Coming as they do from the Treasurer of the National Aeronautic Association, they deserve serious consideration. His suggestions are:

"No limitation on experimental construction. Retirement law for mail pilots if one is not already in existence. Unification of local aero clubs and the national aeronautical organization, and having chapters in all cities and towns which will stimulate flying in all localities."

Brig. Gen. Milton F. Davis

Brig. Gen. Milton F. Davis who is a retired Army officer and is Commandant of the New York Military Academy, has written approving every point of the Suggested National Air Policy with the added suggestions that if possible the champion of our national air policy should be a member of The Cabinet; that the Aircraft Committees of the House and Senate should as rapidly as possible include fliers in their membership; that a Federal Air Police should enforce any aviation law, and that the national aeronautic organization should be led by men with a knowledge of the aeronautic problems of the country. His final suggestion is that every week of the year be an "aviation week," during which the country will think of aerial progress.

General Davis is the ranking officer of the Air Service Officers Reserve Corps and is one of the most popular men in aviation circles.

L. S. Horner

A very valuable suggestion comes from L. S. Horner, Chairman of the New Haven Air Board and a Governor of the National Aeronautic Association for Connecticut. He writes:

"I feel that you have left out of emphasis one of the most important matters of all, and that is the necessity for cities

of one hundred thousand or more having a landing field.

"It has been my feeling that one of the biggest jobs in interesting the people of our country was to have in front of them the practical every day demonstration, as soon as we could, of planes being commercially used for mail and packages actually leaving fields close to the cities in question, and I feel that this idea should be featured ahead of anything else in the development of this new method of transportation, which I feel sure is rapidly coming.

"I doubt if the ordinary citizen would understand that 'National Airway System' means a landing field in the vicinity of a city. Strictly speaking it is of course the proper interpretation. My suggestion would be that you clearly state—'Establishment of Landing Field by all cities of one hundred thousand or over.'"

Congressman La Guardia

While many other helpful and constructive comments have been received, one from Congressman F. H. La Guardia is so sweeping in its indictment that AVIATION hesitated to print it. But as Major La Guardia played an important role in aviation during the War and as a Congressman has taken an active interest in aviation—conducting one very important investigation, his suggestion, though very general in its condemnation, represents his convictions and as such is entitled to a place in any open and frank discussion of a National Air Policy. He writes:

"The first step toward the establishment of a real National Air Policy is to put all the crooks, grafters and fakers out of office. After that it seems to me it would be easy. I am preparing an article for you, but, of course you will not publish it."

As this discussion of a National Air Policy was undertaken to afford those interested in aerial progress a forum for the exchange of views, it is open for free expression of opinion from those whose standing in aeronautics is recognized.

Floyd J. Logan

The last letter that there is space to include in this issue is from Floyd J. Logan, who can speak from the standpoint of the commercial operators of aircraft. He is a jobber in aircraft and aircraft supplies as well. His long experience gives his views great weight and they will be read with interest. His constructive suggestions are as follows:

"Complying with your request for an expression as to the National Air Policy proposed by you as well as making any suggestions, I would state that it seems very good, and is greatly to be commended.

"The two main factors which will be productive of the most prompt results in a commercial way are the establishment and maintenance of satisfactory landing fields in or adjacent to each town or city, and the carrying on of *safe and sane flying only*. By this is meant to include not only the flying but of and in aircraft in proper condition, and not overloaded, and flown by a pilot who is competent, and flying done out of a field of such length, breadth, condition and surroundings that there is a factor of safety with the operator, rather than the handicap of the question mark whether he can get out of or into the field.

"Constant contact with the commercial operators all over the United States shows that at least 95 per cent of the accidents are preventable, and that at least 90 per cent of them are wholly unwarranted. The 'take a chance' attitude is altogether too prominent and the results are anything but gratifying. With proper fields, properly located, properly conditioned aircraft, competent operators, safe and sane flying, and accompanied by competent and aggressive management, there is absolutely no reason why commercial operation of aircraft should not pay splendidly, taking into consideration the very low price at which aircraft can be purchased and the extremely low price of parts to keep same in service.

"Frankly, aviation is blamed for a lot of things which are directly traceable to either incompetency, carelessness, or mismanagement. The unsatisfactory results obtained in such instances would occur in any other line of business were the same incompetency, carelessness, or mismanagement to take place."

American World Flight

When this was written the American fliers were still at Reykjavik, Iceland, awaiting favorable weather to attempt an 825 mi. flight to Frederiksdal, on the southern end of Greenland. The long flight was decided upon after the Gertrude Rask had reached Angmagsalik but had found the harbor too full of ice to be safe. Scout planes from the Cruiser Richmond found a harbor a little further up the coast but this also was ice bound and it was impossible to get supplies there.

Lieutenant Wade's new plane, piloted by Lieuts. George C. McDonald and Victor E. Bertrand, arrived at Pictou, N. S., on Aug. 12.

Argentine World Flight

Major Zanni was held up several days at Calcutta awaiting a new propeller. When this arrived he blew a tire taking off. However, on Aug. 1 he flew to Rangoon, Burma, and on the next day left for Bangkok, Siam, but was forced to land at Tavoy due to lack of fuel.

According to R. C. Noorduyn, American representative of the Fokker Co., the "mystery ship" in which Zanni will attempt the flight across the Atlantic will be a Fokker TW3 monoplane, fitted with a Napier Lion engine.

Italian Follows Americans

Lieutenant Locatelli, the Italian aviator flying one of the Dornier planes which was to have been used by the Amundsen flight to the North Pole, left Pisa, Italy, on July 25. Flying by easy stages he crossed the Alps, landing in the Swiss lakes, and then followed the Rhine to Rotterdam and from thence to Brough. From there he followed the route of the Americans except that he stopped at Stromness and the Faroe Islands. On Aug. 17 he joined the Americans at Reykjavik, Iceland.

The plane which he is using is the Dornier "Wahl" fitted with two Rolls Royce engines. This ship was described in the April 23, 1923, issue of AVIATION.

Chance Vought Secures Cuban Order

The Chance Vought Corpn., of Long Island City, New York, recently closed a contract with the Cuban Government for Vought airplanes. Chance Vought, designer of the standard U. S. Army and Navy advanced training airplanes, and the new Navy UO type observation and combat planes, represented his company in the negotiations, while the Cuban representatives were Major Ortega and Lieutenant Labordi of the Cuban Air Service, acting for General Montes, Secretary of War, and the Cuban Consul General at New York City.

New planes of the latest Vought U. S. Navy combat and observation type are to be constructed under the contract, and designated as Vought model QO2. They will be powered with the new J4, 220 hp., air-cooled Wright radial engines. The planes will be fitted with 30-calibre machine guns and will carry fragmentation bombs.

To add to the military value of the planes they will be of the Navy convertible type, so that the standard Navy UO1 water type alighting gear may be quickly installed in place of the land gear, if the planes have to be sent on long over water flights. The planes, as seaplanes, will have a full load performance in excess of 122 mi./hr., and a cruising radius, at economical speed, of over 5 hr.

These new Vought planes were ordered after a careful study of types by the Cuban Aviation Mission in the United States for the past two months and have been adopted by the Cuban Government as its standardized design for this type.

It is understood that the inspection of the new ships will be made for the Cuban Government by the regular force of U. S. Navy inspectors stationed at the Vought plant.

This is the first foreign order in many years for new American service planes. In view of the activities of the official European aviation missions which have been operating in Central and South America since the World War, this order from Cuba assumes added importance.

LIGHT PLANES AND GLIDERS

Edited by Edmund T. Allen

Control in the Light Plane

The following article by Prof. Edward P. Warner, was written for this department in response to the general need on the part of those building light planes, for the information it contains. It will be especially valuable to designers of light planes because their data must be largely empirical, and their information, that obtained from practical experience of lightly loaded machines in flight. It will be remembered that the great difficulty at one of the European Glider Meets of 1922 was inadequacy of control. Professor Warner attended two of these meets, and saw at least one glider with its rudder and flippers waving violently and having apparently no influence whatever upon the flight path of the machine. Lucien Coupet, of recent world record fame, was not bothered. He simply shouted to those in the pasture below, "chassez les vaches" *and landed straight ahead. He couldn't turn!—E.T.A.*

The provision of sufficient control has always been a stumbling-block for the designer of small airplanes, particularly those with very low wing loading, and of gliders. The ordinary rules for the proportioning of the control members have often seemed to break down and to lead to inadequate areas quite incapable of overcoming the effect of atmospheric disturbances. It was a common complaint among glider pilots, at the height of the glider enthusiasm two years ago, that it was impossible to raise one wing when it had dropped beyond a certain very moderate angle and that the directional control was often worse than useless. In fact, one glider which made quite a successful record could only be turned by the expedient of banking very steeply and pulling around with the elevator.

Where such difficulties have arisen, they have been due to one of four causes. Either the area has been absolutely too small, or the form and section selected have been such as to make the controlling members inefficient, or the controls have been blanketed by the fuselage or wings so that they worked in dead or slow-moving air, or there has been some internal distortion of the structure under load in such a way as to neutralize the effect of the controls themselves. The last two causes have probably accounted for most of the troubles experienced, blanketing by the fuselage having a particularly bad effect on the rudder, while distortions of the structure are most important in their relation to aileron control, although they may also intervene to reduce the power of the rudder.

Turning first to areas, neglecting for the moment the modifying factors, if it can be assumed that the structure will remain perfectly rigid and that there is no unusual aerodynamic interference between its various parts the proper areas for control members can be roughly stated in terms of wing area. If the distance from the center of the tail forward to the center of gravity of the airplane is half the wing span, and if the loading be 4 lb. per square foot or more, the combined area of stabilizer and elevator should be roughly 12 per cent of the wing area, while the rudder and fin together should total about 5 per cent of the surface of the wings. When the loading is very light the percentages may be increased to about 16 and 7, respectively. All these figures would, of course, be modified by any change of fuselage length, the tail surface being increased roughly in proportion as the arm at which the tail works is decreased. Furthermore, it is advisable to increase somewhat the amount of horizontal tail surface and the ratio of horizontal to vertical surface when the aspect ratio of the airplane is low, while a machine with large aspect ratio, on the other hand, should have more than the normal proportion of rudder. A failure to recognize this fact perhaps accounts for the seeming insufficiency of the directional control on many gliders.

The amount of control surface that should be provided is, of course, intimately connected with the degree of longitudinal stability desired. It can be laid down as a general rule that the stability of the airplane will increase steadily as the center of gravity is moved forward on the wings, and it will be found that if the proportions of the tail surface follow the percentage rules just given the stability will be about right when the center of gravity of the whole machine is 30 per cent of the way back from the leading edge of the mean wing chord. If it be placed much farther back than that the airplane will become tricky and will be impossible to fly with free control, while if the weight is centered too far forward the control is unduly stiff and it is difficult to get the tail down for landing. The center of gravity can be moved somewhat further back if the size of the horizontal tail surfaces is above the normal.

If a fixed stabilizer is used, the angle at which it should be set is of course dependent primarily on the location adopted for the center of gravity. If the practice here recommended be followed, and if the stabilizer be made of symmetrical section with the same camber for the upper and lower surfaces, it should, in general, be set with the center line at an angle of about -2 deg. to the wing chord. The negative angle of setting should, however, be somewhat greater behind a thin wing than when a thick section is used.

The area of the ailerons should be approximately the same as that of stabilizer and elevators combined. Here, however, as in the case of the tail surfaces, it is better to err, if at all, in the direction of providing too large an area. There is very little danger that the force required to operate the controls will be unpleasantly large, and the principal thing to be feared is inadequacy of surface, and so of power.

The second factor was that of general form of the surface, and its most important phase can be quickly disposed of by saying that the effectiveness of a control surface depends largely on its aspect ratio, which should, therefore, be as large as practicable. The ratio of the overall span of the horizontal tail surfaces to the combined chord of stabilizer and elevator should be at least 2, and a figure in the neighborhood of 3 is much better. The height of the rudder, also, should be fully twice its depth, and the span of each aileron from 3 to 5 times its chord. The sectional form of the members is unimportant when compared with their plan form, but for structural reasons, if no other, it is best that they be fairly thick, and such a section has certain advantages, even from an aerodynamic point of view. A maximum thickness of 1/12 of the overall chord is about right.

Of the last two points, the interference between parts of the structure and its mechanical distortion, comparatively little need be said. Interference, in the case of the rudder, can best be avoided by using a rudder of large aspect ratio and letting it project well above the top of the fuselage and above the pilot's head. In order to avoid interferences between fixed and movable surfaces in direct contact, it is best that the chord of an elevator placed behind a stabilizer should be fairly large, at least three-fourths as great as that of the stabilizer itself, and that the chord of an aileron attached to a thick wing should be not less than one-fourth of the wing chord.

The effects of distortion, as already noted, are most serious in connection with the ailerons, since the effect of pulling an aileron down is to bend the rear wing spar up, and so to twist the wing in such a direction as to give a load exactly opposed to that on the aileron itself and to neutralize the control effect. The only way to prevent this is by the use of external bracings, or by making the wing spars deep enough and using cross-bracing between the front and rear spars with sufficient strength to insure a considerable stiffness of the structure in torsion, or a large resistance to any twisting.

AIRPORTS AND AIRWAYS

Closing Date for Dayton Entries

Sept. 1 is the closing date for free entries in the International Air Races which are to be held at Dayton on Oct. 2, 3 and 4. Twenty-five per cent penalty entries close Sept. 8, while 50 per cent penalty entries close Sept. 15. Entries received after Sept. 15 will only be accepted with the written consent of all other entrants, and the entry fee will not be refunded.

Chicago News

By R. W. Schroeder

Eagle's Flying Field, the home of the Eagle Flyers, is the name of a new flying field located in Lake Street, between the towns of Elmhurst and Addison, Ill. Just 17 mi. from the heart of Chicago, with rapid transportation on the Aurora Elgin Electric trains, or the Northwestern Railway at Elmhurst, into the city, and with landing space enough makes this field a valuable addition to commercial aviation.

The field proper is on a forty acre tract of land, but as the surrounding fields of hay, wheat, etc. are cleared, the field expands to a good 100 acres. The only obstacle within from one to two miles of the field, outside of a low line of telephone wires following the highway, is a lone tree about 200 ft. on the field. This tree will be transplanted in the fall.

During the few weeks the field has been in operation, there have been erected an office building, with a large screened-in porch, a refreshment stand, ticket booth, toilet conveniences, decorative columns, and a safety line of rope across the entire south end of the field. A 20 x 50 ft. shop will be under construction soon, which will give plenty of room for wing repairing and motor overhaul work. There will be three canvas hangars erected this year for the housing of the planes. Next year a large boarded-in hangar will be built to house six ships.

The personnel of the Eagle Flyers consists of T. W. Barker, general field manager, formerly with the U. S. Air Mail Service, and the Checkerboard Airplane Service; Ogden Johnson, promotion manager; Joseph R. James, chief pilot; Pilots Frenchie Bouchard and Bob Radoll; W. E. Gray, chief mechanic, formerly with the Air Mail Service; Dick Powell, (performer) professional stunt man, and Miss Ethel Dare, performer.

The business of the Eagle Flyers will be the carrying of passengers, exhibition work, aerial advertising and photographic work, etc., and the Eagle's Flying Circus will stage performances at fairs and other celebrations. The Eagle Flyers, Route 2, Elmhurst, Ill.

Ardmore, Okla., News

By William Krohn

Considerable credit is due Arthur Oakley and Dorsey Askew, owners of the Oakley-Askew Aerial Service of Ardmore, Okla., for their untiring efforts in this section of the country in the interests of aviation. For three years these youngsters have been engaged in the flying business here, starting with a single plane made up of remnants which their meager finances enabled them to acquire. Today, they have on hand more than a dozen good used ships which they are conditioning for sale. In addition, at their hangar north of the city, there are parked more than half a dozen private owned planes of various types, owned by pilots who were trained by Askew and Oakley.

They conduct a regular passenger service, with Tulsa and Dallas, the chief cities to which they fly, although they make frequent trips of much longer duration. They have built up a fine business.

Among the many students who have been taught how to fly at this field are four drilling contractors engaged in work in the various oil field districts of the state. These men, two of whom are in the forties, while the others are near that mark, have become efficient pilots and are continually making long-distance flights, with landing fields at some of their termini demanding most efficient handling to get down safely. These four contractors own eight ships.

Oakley and Askew cooperate with Army Reserve officers here, permitting them to fly ships for a nominal cost.

Askew is regarded as one of the most efficient pilots in the country. After serving as a flying officer in the army during the war, he continued in the game and has never had a serious accident, although his flying time covers thousands of hours and he has carried hundreds of passengers.

Oakley was formerly an aerial acrobat and gained national prominence some years ago as a wing-walker. He has ceased his hazardous escapades and is now piloting exclusively.

At the coming session of the legislature this winter it is the intention of the association to seek a state law licensing pilots and planes, money to be devoted to the maintenance of municipal landing fields.

In the first air race Lindberg and Valeske, of Minneapolis, won first place, with H. W. Tennant of Sioux Falls, second. Time for the 28 mi. was 28 min.

The race for standard planes of 100 hp. or under was won by Ray Crane of Miller with Clyde Ice of Miller, second. Time for the 15 mi., 14:35.

Two entries got away in the race for standard planes of 100 hp. or over. Representative Beach of the Swallow Airplane company of Wichita, Kan., in his blue Swallow, was first, and E. M. Canfield of Fullerton, N. D., driving a Petrel, made a close finish in second place.

Ray O'Brien made a parachute drop both evenings and there was night flying and fireworks.

Akron News

Rules governing the inspection and flight testing of all planes operated from the aviation fields in and about Akron were passed by the Commercial Aircraft Association at a meeting held Thursday, July 24, in the assembly room of the Babcock Airplane Co.

All members of the association who own planes have been requested to prepare for the tests within the next few weeks. A committee of pilots, headed by Harold A. Kullberg, president of the association, will handle the work.

When planes are found to be airworthy a seal of C.A.A. will be placed on the ship as a part of the program to protect the safety of the public and the fliers as well.

A steady increase in the membership of the new organization has been noted during the past two months. Over 100 are now enrolled and the board of directors hope to increase this substantially before early fall.

* * *

Akron, through the efforts of the Chamber of Commerce and the local chapter of the National Aeronautic Association, may have an air mail field within the next year, it is believed.

The committee on aeronautics of the chamber, headed by W. C. Young, manager of aero sales, the Goodyear Tire & Rubber Co., has started a survey of flying fields about the city and has announced that several are being considered.

It is pointed out that mail from Akron intended for western points could be handled much more rapidly and efficiently if the city had air mail facilities.

Postmaster C. Nelson Sparks, an active member of the N.A.A., and an aviation enthusiast has promised his support to the movement.

* * *

Akron was paid two visits during July by army fliers from McCook Field, Dayton, Ohio, who "hopped into" the city on government business with the Goodyear Tire & Rubber Co.

Capt. George E. Kinney, with a sergeant mechanic, was the

first Service flier to land here, and on July 30 Capt. W. B. Mayer, Lieut. H. R. Wells and Lieut. R. E. Robillard brought a DH4 to the Maple Valley Field near East Akron. The trip was made in 1 hr. 45 min.

* * *

Lieut. Max F. Moyer, district manager of balloon production and inspection for the Army at the Goodyear Tire & Rubber Co., returned to Akron July 28, from an European trip.

Lieutenant Moyer was detailed as alternate pilot of the Army balloon piloted by Maj. Norman W. Peek in the International Race from Brussels, June 15. He also acted as operations officer for the Army Air Service.

Major Peek will return later in the summer. He is also stationed in Akron.

* * *

A toy free balloon race, held by members of the aeronautic staff of the Goodyear Tire & Rubber Co., has been in progress for the past month.

The small bags, inflated with hydrogen, were released at one of the lake resorts late in June, with cards attached bearing the name of the sender.

Cards were returned to Akron from all over eastern and southern Ohio, and recently G. D. Mallory received his from Evans City, Pa., a distance of 85 mi. airline from the starting point.

* * *

Improved runways for Stow Field, near Akron, have been planned by Fred Smith, owner of the station, and will be started within the next few weeks. A second fueling tower was installed at Stow recently.

* * *

Over 100 attended the annual outing held by the aeronautical design, aero workshop, aero sales and army office departments of the Goodyear Tire & Rubber Co., Saturday, Aug. 2, at Turkeyfoot Lake.

Movie Director Uses Air Mail

Former Postmaster General Will H. Hays was the first business man of large interests to take full advantage of the rapid transcontinental Air Mail Service which the Post Office Department put into effect.

Mr. Hays is now on his semi-annual visit to the studios of the motion picture producers and distributors of America at Los Angeles. Before leaving his New York office he gave directions that statistical reports, communications from his staff, and other documents that could not well be transmitted by telegraph, be forwarded by Air Mail. The result of this was that when he reached the west coast every detail of his business for the previous 48 hours was waiting for him. These daily reports will go forward during his stay in Los Angeles, which will be two weeks or so. The twenty-one large distributing and producing companies which Mr. Hays represents are planning, until his return, to use the Air Mail Service for transmitting their business papers.

Fast Delivery Service

Floyd J. Logan, the Cleveland aircraft dealer, reports the following instance of how the Air Mail is speeding up communication:

"As the *Cleveland News* would put it—this is an exclusive interview. July 28 about 5:30 p. m., notice arrived from the Western Union, advising that a sum of money accompanied by a message was awaiting me at their Cleveland main office. I immediately requested it to be transferred to the branch near my office. This money and message did not arrive at my office until after 6:00 o'clock, and I immediately sent via Air Mail to Newbold D. Wheelock, of New York City, one pair of NAK resistal goggles. Mr. Wheelock advises that he received the goggles at his office at 11:00 o'clock on the morning of July 29, notwithstanding his telegram had not been sent from New York City until 5:00 o'clock the night previous.

"This is a fair sample of what air mail delivery and my fast service are accomplishing."

Freight Airplane Tested

The new Remington-Burnelli aerial freight carrier, began a series of test flights on Aug. 7, at Curtiss Field, Long Island. Lieut. George Pond, test pilot from the Anacostia Naval Air Station, Washington, D. C., piloted the ship in the first flight of 40 min., during which an altitude of 4,200 ft. was attained. Romer Weyant, the plane's regular pilot, and a passenger were also on board during the flight. Two Atlantic-Galloway engines of 520 hp. each, drove the plane at the rate of 85 mi./hr. Lieutenant Pond, who has been assigned to test the craft's possible fitness for navy use, pronounced the first flight satisfactory in every way.

The new ship, known as the RB2, is from design by Vincent J. Burnelli of the Remington-Burnelli Aircraft Corp., New York. The airliner has no passenger accommodations as it is designed for freight carrying. In the ship are incorporated several changes and refinements which were found desirable as a result of experience with the first airliner.

The RB2 is a biplane with a wing area of 1525 sq. ft.; 84 ft. span; USA27 wing section with scout truss and duralumin covering. The landing gear is equipped with two 54 x 12 in. wheels. The cabin is 6 ft. 4 in. high 14 ft. wide and 18 ft. long. In plan the fuselage tapers to the tail and a door is provided on each side. The Atlantic-Galloway engines, of Scotch manufacture, were the largest engines in production in England at the close of the war. They weigh 1365 lb. each without starters. They are of the heavy duty, slow speed type, turning at 1500 r.p.m., thereby giving a very good propeller efficiency. The propellers are 11 ft. 4 in. in diameter.

Completely loaded the plane weighs 17,100 lb. and has a fuel and cargo capacity of 8,050 lb. The designed performance calls for a full speed of 108 mi./hr.; landing speed, 55 mi./hr.; climb, 4000 ft. in 10 min.; ceiling, 12,000 ft. Fuel for 6 hr. will be carried.

Entries for Bartlesville Meet

The following entries have been received for the On to Bartlesville Race to be held in connection with the Bartlesville, Okla., Aero Exposition, Sept. 1 and 2:

B. H. Griffin, Laird Swallow, OX5 90 hp. from Oklahoma City.
Merle Brock, Canuck, OX5 90 hp. from Oklahoma City.
M. M. Merrill, T.M. Scout, OX5 90 hp. from Dallas, Tex.
Walter H. Beach, special Swallow, 150 hp. Hispano Suiza from the Swallow Airplane Co., at Wichita, Kan.
Earl Beach, Swallow, OX5 90 hp. from Wichita, Kan.
Ted Moellendick, Swallow, OX5 90 hp. from Wichita, Kan.
William A. Burke, Laird Swallow, 150 Hispano from Okmulgee, Okla.
D. A. Askew, special Canuck, OX5 90 hp. from Ardmore, Okla.
F. C. Wallace, Curtiss Oriole, K6 150 hp. from Betendorf, Iowa.
E. J. Carlson, special Canuck, OX5 90 hp. from Betendorf, Iowa.
D. A. McIntyre, Bristol Fighter, Siddelley Puma 240 hp., from Tulsa, Okla.
William Collier, Standard, 150 hp. Hispano Suiza from Oklahoma City.

Practically all the entrants in the On to Bartlesville Race have entered in the other events. The management considers this an excellent showing as the meet was first announced in AVIATION on Aug. 4, and the above entries were received the following week. They feel sure that at least 75 planes will be present, as further inquiries are coming in at a good rate.

In the Military Trophy Race there are entries from Richards Field, Kansas City, Mo., and others are expected from Kelly and Post Fields.

Aberdeen, S. D., News

By J. H. McKeever

Commercial and amateur aviators of the northwest launched the Dakota Aeronautical Association, on July 26, at the close of a two-day program of stunt flying, air racing and passenger carrying including a banquet given by the Aberdeen Commercial Club to thirty visiting pilots and mechanics. Fifteen planes participated in the events.

The permanent organization passed a resolution pledging fliers to refrain from stunt flying while carrying passengers.

The officers elected were, President, K. O. Schneider, Miller, S. D.; Vice President, F. B. Irvine, Linton, N. D.; Secretary-Treasurer, E. C. Curran, Spearfish, S. D. It was decided to hold the meet again at Aberdeen next year.

Glenn H. Curtiss Goes Abroad

Among the distinguished passengers sailing from New York on the Aquitania Aug. 6 for England was Glenn H. Curtiss. It is reported that he will look over recent aeronautical developments in England and on the Continent.

UNITED STATES AIR FORCES

U. S. ARMY AIR SERVICE

Army Air Orders

Following Officers, A.S. Off. Res. Corps., to active duty, McCook Field, for training, reverting to inactive status Aug. 18: Capt. Charles Lewis Hayward, Capt. William Albert Hyde, Capt. George Caldwell Furrow.

Following Officers, A.S. Off. Res. Corps, to active duty, Rockwell A. Int. Dept. Rockwell Field, reverting to inactive status Aug. 17: Capt. Earl Hamilton McCollister, San Rafael, Capt. Anthony Earl Van Harten, Salt Lake City.

Sec. Lt. Louis French Dorsey, A.S. Off. Res. Corps, Washington, to active duty McCook Field for ten days training, reverting to inactive status Aug. 18.

Sec. Lt. Dean S. Ellerthorpe, A.S., Adv. Fly. Sch., Kelly Field, to Com. A.S. Prim. Fly. Sch., Brooks Field.

Sec. Lt. James W. Fletcher, A.S., Adv. Fly. Sch., Kelly Field, to Com. A.S. Prim. Fly. Sch., Brooks Field.

Capt. Harry Cornish Sigourney, A.S. Off. Res. Corps, Washington, to active duty, Ch. A.S., Washington, for training, reverting to inactive status Aug. 15.

Spec. Orders Dec. 14, 1923, amended to assign First Lt. Frank D. Hackett, A.S., to Crissy Field.

First Lt. Earl H. Tonkin, A.S., Crissy Field, to Kelly Field.

Sec. Lt. Russell S. Ryan, A.S. Off. Res. Corps, to active duty Aug. 11, from Albion, N. Y., to Ch. A.S. Washington, reverting to inactive status Aug. 25.

First Lt. Charles Otto Dost, A.S. Off. Res. Corps, to active duty Aug. 12 from New York to Mitchel Field, for training, reverting to inactive status Aug. 26.

Capt. Guy Francis Donohue, New York and Sec. Lt. Edward Ellsworth Bishop, Phoebus, Va., Aug. 15 to Active duty Ch. A. Serv., Washington, for training, reverting to inactive status Aug. 29.

Capt. William Montgomery Reading, A.S. Off. Res. Corps, to active duty Aug. 15 from Washington to Ch. A. Serv., for training, reverting to inactive status Aug. 29.

First Lt. James Emory Scheirer, A.S. Off. Res. Corps, to active duty Aug. 18 from Atlanta to Com. Off. San Antonio, for training, reverting to inactive status Sept. 1.

Capt. Louis George Meister, A.S. Off. Res. Corps, to active duty Aug. 5, from McCook Field to Ch, A. Serv., Washington, for training, reverting to inactive status Aug. 19.

Special orders July 29, relating to First Lt. Wayne Sanger Green, A.S. Off. Res. Corps, revoked.

Special Orders, July 15, relating to First Lt. John E. Upton, A.S., amended to read First Lt. John E. Upston, A.S.

Sec. Lt. George Dugan Converse, A.S. Off. Res. Corps, to active duty Aug. 1 from Somerset, Ky., to Com. Off. Langley Field, for duty with Bomb. Gr., reverting to inactive status June 30, 1925.

Aviation Mechanics School

The Aviation Mechanics School at Great Lakes is now being used for advanced instruction of rated men of the aviation branch, and the Bureau is not authorizing the transfer to the school of any nonrated men or rated men of general service ratings.

The petty officer requirements of the aviation branch are being met by training nonrated men for advancement to lowest petty officer ratings at all Air Stations, and in the Aviation Squadrons Afloat.

All advancements in the aviation branch are being made by promotion through the lowest petty officer rating of that branch and no petty officers of general service ratings are being transferred to aviation duties or ratings, except men now on the aviation rating eligibility list.

All aviation commands have been requested to give particular attention to the training of men for aviation duties.

Nonrated men who request aviation duty will, when practicable, be ordered to fill the nonrated billets at Air Stations and in the Aviation Squadrons Afloat.

Revision of Designers Handbook

The Engineering Division of the Air Service, McCook Field, Dayton, Ohio, has proposed revision of section 2, part 1 and 2 of the Handbook for Airplane Designers.

Air Pilot Interviewed by Radio

An enterprising semi-official reporter of the Army Air Service recently demonstrated the possibilities of interviewing aviators while aloft.

When Mr. Jacobs, the correspondent, saw Lieut. A. L. Johnson of McCook Field, Dayton, take off in a DH and disappear in the clouds, he wondered how it was up there, and going to the field radio laboratory he arranged for the tuning up of the SC 136 set, in hopes of calling up the pilot.

Operator "Pop" Leland started the dynamometer, threw some switches and began turning the dials.

"Hello-hello-hello," Leland called into a hand telephone in the most approved radio voice. 'This is A-W-5 talking. Somebody wants to speak to Lieutenant Johnson. Can you hear me Johnson ? Come in - come in - come in."

Then from the moving plane out of sight in the clouds, came faintly, but unmistakably, Lieutenant Johnson's voice:

"Hello - hello - A-W-5, Johnson speaking. Can hear but cannot understand very well—seems to be a great deal of static. Try again."

"Pop" tried again. There was more turning of dials and talking, then I was handed the telephone and the head piece.

"Hello, Lieutenant Johnson," I said, "can you hear us ? If so, we'd like to know where you are just now and how the weather is up there."

Clearly, as if in the same room, Lieutenant Johnson's voice came back. "We are flying over New Lebanon, Ohio, at an altitude of about 4,000 ft. and are climbing steadily to get above the clouds. The clouds are very thick this afternoon, scattered from 3,000 to 6,000 ft. The thermometer registers 45 deg. which, with our suits and helmets, makes a comfortable flying temperature. We are traveling at a speed of 80 mi./hr. Now we have climbed to about 5,000 ft. and are in clear sunshine. New Lebanon lies hidden below. Dayton lies to the east of us but we cannot see it. We are now over West Carrolton. Can you hear me ?"

"I can hear you distinctly, Lieutenant Johnson. With what kind of radio set is your plane equipped ?"

Lieutenant Johnson: "It is known as type SCR-134. The receiving unit is a superheterodyne with VT5 peanut tubes. The set is shielded in order that the ignition noises of the engine may be cut out and hearing made easier. We carry a trailing wire antennae with a 5-lb. lead weight. The metal parts of the plane, the wires of the fuselage and the wings, are all bonded together and act as a counterpoise. In principle, it is the ordinary transmitter and receiver used the world over, but we have special adaptations to make it serviceable and practical for air use, worked out by the Signal Corps and tested at McCook Field."

A little later, Johnson again came in: "We are now over Wilbur Wright Field and the Huffman Dam. Since talking to you we have flown over several towns and are now headed for McCook Field. If there are no bill collectors about, we'll come down."

We: "The coast is clear. This has been quite interesting, Lieutenant Johnson, and it would seem that if one wants to interview a pilot while flying, one must work fast." Lieutenant Johnson answered: "You bet. There never was supposed to be anything slow about a pilot anyway."

U. S. NAVAL AVIATION

Naval Air Orders

Ens. Ralph T. Zinn, det. U.S.S. Maryland, to temp. duty under instr., Nav. A. Sta., Pensacola.

The following officers from stations noted to temp. duty under instr. Nav. A. Sta., Pensacola: Lt. Robert T. Whitten det. Nav. Trng. Sta. N.O.B., Hampton Roads; Ens. William A. Engeman det. U.S.S. Preston; Lt. (jg) Jesse G. Johnson det. U.S.S. Langley; Ens. Howard L. Jennings det. U.S.S. Charles Ausburn, orders July 19 revoked; Ens. Bates H. Johnson det. U.S.S. Pennsylvania; Ens. Clarke H. Lewis det. U.S.S. Maryland; Ens. Herschel A. Smith det. Nav. Acad., Annapolis; Ens. Carlisle H. Thompson det. U.S.S. Pennsylvania; Ens. John P. Whitney det. U.S.S. Procyon; Ens. Robert G. Willis det. U.S.S. William Jones.

Lt. Harry F. Carlson det. Nav. A. Sta., Anacostia, to temp. duty involving flying, Nav. A. Sta., Pensacola.

Lt. Clarence H. Schildhauer det. Airft. Sqd., Setng. Fleet, to Nav. Airft. Fact., Nav. Yd., Phila., involving flying.

Lt. Harry F. Carlson, det. Nav. A. Sta., Anacostia, to Nav. A. Sta., Pensacola, involving flying; orders July 23 revoked.

Lt. (jg) Rowland D. Hill det. U.S.S. Antares, to temp. duty under instr. aviation Nav. A. Sta., Pensacola.

Lost Balloon Obsolete Type

According to a Navy Department statement, the loss of the kite balloon which broke adrift from the Naval Air Station, Lakehurst, N. J., was estimated in money value at approximately $150 instead of the $50,000 reported in various press accounts.

The kite balloon was an obsolete type formerly used on shipboard during the war. A number of these balloons are still on hand in the Navy but the type has been discontinued in service. They have been used at Lakehurst for testing parachutes by dropping the parachutes from the basket of the balloon.

Panama Grants Air Stations

The Panaman Government has decided to accede to the request of the United States for permission to establish two fueling stations for airplanes on Panaman territory.

Where to Fly

CALIFORNIA
Learn to Fly in San Diego—The City of a Thousand Planes
THE RYAN SCHOOL OF AVIATION
Offers ideal flying conditions all seasons. First class facilities and equipment. Opportunity to study latest type planes and construction. Complete flying and ground course at reduced rates for a limited time.

CALIFORNIA
VARNEY FLYING SCHOOL
Established since 1914
SAN MATEO SAN FRANCISCO

ILLINOIS
HEATH AIRPLANE COMPANY, Inc.
Oldest aeronautic establishment in U. S.
Airplane Supplies — Flying School
2856 Broadway — Chicago

ILLINOIS
PARTRIDGE, Inc.
Aeronautical Instruction
Aero Club of Illinois Field. Chicago, Ill. *Write for Booklet*
Mail Address-- 430 S. Michigan Ave.

ILLINOIS
FLY THEM YOURSELF
Jennies by the hour. Flying Instruction by the hour. Ex-Air Mail Pilots as Instructors. All size Ships and Motors. All year Flying.
YACKEY AIRCRAFT COMPANY
Flying Field, Chicago Air Park, 63rd and Cicero, Chicago, Ill.

ILLINOIS
MID-WEST AIRWAYS CORP.
MONMOUTH, ILL.
One of the four best fields in America
Thorough Flying Instruction Course by experts at lowest rate.
Passenger Flights to Points Near or Far

KANSAS
AVIATION ENGINEERING CO.
Popular Priced Light Airplanes
Flying Instruction and Advanced Shop Course
N. 7th & LINCOLN — LAWRENCE, KANSAS
40 mi. from Kansas City on Victory Highway

MARYLAND
THE SKYSYNE CORPORATION
NIGHT & DAY AERIAL ADVERTISING
OFFICE 711 Keyser Bldg. Baltimore — *Get our prices FIRST* 3 Planes at your order — AIRDROME Logan Field Dundalk, Md.

MISSOURI
NICHOLAS AIRPLANE CO.
LEARN TO FLY WITH US
Canucks, Jennies, and Standard airplanes, parts, motor supplies, passenger carrying, etc. Flying field 1 mile from city.
MARSHALL, MO.

MISSOURI
ROBERTSON AIRCRAFT CORPORATION
Airplanes, Motors, Parts, Supplies; Shops and Hangars
ST. LOUIS FLYING FIELD
ANGLUM, MO.

NEW JERSEY
CHAMBERLIN-ROWE AIRCRAFT CORP.
Aerial Advertising, Photography, Passenger Carrying, and Flight Training
New York Air Terminal — Hasbrouck Heights, N. J.

NEW YORK
Curtiss Exhibition Company, Garden City, N. Y.
Flying Fields—Garden City, Buffalo, N. Y.; Dallas, Tex.; Miami, Fla. Complete flying service including schools, aerial photography, passenger and fast cross country transportation to any point. *Machines presented to students who take flying course.*
WRITE FOR BOOKLET

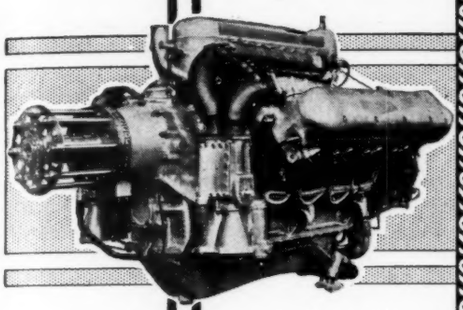
NEW YORK
PORT WASHINGTON, LONG ISLAND
FLYING BOAT SCHOOL
Clifford Webster—Instructor
Curtiss Metropolitan Airplane Co., Inc.

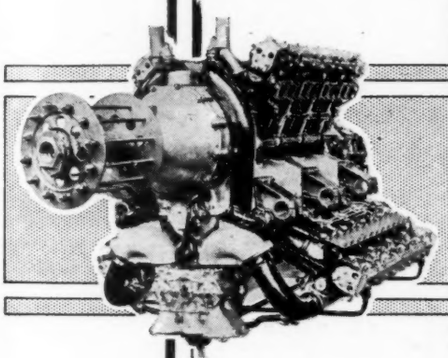
OHIO
AKRON-CLEVELAND
Flying School for students in Aviation. "Pay as you Learn."
Modern WACO Plane with high-lift wings.
Passenger Rides, Advertising, Photography
STOW AVIATION FIELD
Stop 53 Akron-Kent-Ravenna Car line, Rt. 1, Cuyahoga Falls, Ohio.
Hangars, Supplies
6 mi. northeast of Akron.

OHIO
DAYTON, OHIO
Supplies, Hangars, Shops and Field 1 Mile from Dayton limits.
JOHNSON AIRPLANE & SUPPLY CO.

PENNSYLVANIA
ESSINGTON SCHOOL OF AVIATION
Established 1915 — Frank Mills, pilot
FLYING BOATS, SEAPLANES, AND SPARES
ESSINGTON (just west of Philadelphia), PA.

TEXAS
SAN ANTONIO AVIATION & MOTOR SCHOOL
MUNICIPAL FIELD
South of Town between two Government Fields
AIRPLANES, ENGINES, PARTS, SUPPLIES, SHOPS, HANGARS
City Office, 509 Navarro Street — San Antonio, Texas





325% more NAPIER engines than any other type ! !

An up-to-date resumé of the British Aircraft Industry to May, 1924, published in "Flight" of May 29th, describes 53 types of aeroplanes. The engines fitted to these machines are distributed as follows:

26 - NAPIER Water cooled engines.
8 - 450 H.P. Air cooled engines.
5 - 360 H.P. Air cooled engines.
3 - 350 H.P. Water cooled engines.
6 - other powered engines.

This preponderance of Napier engines is convincing proof of the popularity and superiority of the 450 H.P. Napier aero engine.

If you are considering the purchase of aero engines, a visit by appointment to the Napier works at Acton, will interest you.

NAPIER

D. NAPIER & SON. L[illegible]
14. New Burlington Street. W.1
Works: ACTON, LONDON W.3.

PUBLISHER'S NEWS LETTER

Perhaps at the holiday season of the year, refreshed minds and renewed energy give points of view that may have a bearing on the broader aspects of the more serious problems that are in the weekly routine of publishing. Aviation is so new to most persons that its real significance has not seemed to have been given the consideration that it will at a critical moment or when it becomes a vital matter—such as a means of national defense. Some of these impressions were very evident when the Citadel at Quebec was visited.

* * * *

Quebec is described to visitors as the "Gibraltar of America" and "the most strongly fortified city on the continent." The citadel is the result of the expenditure of $25,000,000 after plans "approved by the Duke of Wellington." The casual visitor views the crumbling fortress with the interest and awe that massive military fortifications usually inspire. But to one whose vision is intensified by the aviation "downlook" these old relics of a bygone military age represent waste and extravagance. Their cost was justified when erected by the British desire for far flung dominion. But they do give the very direct impression that things military become obsolete very rapidly and in retrospect they are monuments of an age that has gone and will never return.

* * * *

When it is remembered that rivers and coastlines are no longer natural boundaries except in a geographical sense, the change that has come over the world will be more apparent. No longer will the older forts or the fixed fortifications have any meaning to a nation with an adequate air force. Defense or offense will not bother with these puny ten or twenty mile horizontal zones. The great change has come in the plane of attack and defense. The vertical plane is becoming of increasing importance and at present the force of gravity is greater and more accurate than any of the man made counter forces. It may take a long time to convince the older military minds of the change in plane but it is as inevitable as the crumbling of the old fortress on the Citadel at Quebec.

* * * *

The possibility of foreign entrants at Dayton seems to be growing less as the time for the race grows nearer. The 75 mile landing speed is likely to be one of the deterrent factors. Even with the present engines the leading contestants may be expected to have a much higher landing speed than is required by the rules for the Pulitzer race. With engines of greater horsepower and greater weight the landing speed will be further increased, so that whatever chance there may have been if the races had been a free for all, the demands for minimum landing speed may serve to automatically eliminate the entering of aircraft that might approach the high speed requirements of a winner.

While the rules may serve to eliminate foreign entries, there is no question about the soundness of the standard set for minimum landing speed.

Encouraging the development of speed at the expense of safety and practical utility is not progress in the right direction. This very rule may be the safety clutch that will prevent a senseless competition for speed that will not be of any service when developed. "Flying engines," which is really a correct designation for speed planes, should be judged by aerodynamical standards rather than by their sole quality of mi./hr.

* * * *

Another problem is that the Pulitzer regulations call for testing the characteristics of all contestants' wings in a wind tunnel before the race. The committee has designated the Wind Tunnel of the Massachusetts Institute of Technology for these tests. As the foreign constructors who are considering sending airplanes for the race have not had sufficient time to determine finally the exact wing that they would use, this rule, too, may act as another deterrent. It is known that the French airplane designers do not like this regulation, as they wish to have the opportunity of changing their wings right up to the time of the starting of the race.

This rule involves a disclosure of what might be considered the secret key of the combination that unlocks the whole works. Entirely aside from other considerations such as those of expense and time, these two rules may in themselves prevent this year's race from being an international affair.

* * * *

It is one of the most encouraging signs of the interest that is being taken in the future of aviation to read the many letters of suggestion that have been received in connection with the Suggested National Air Policy. Without any feeling of self-achievement, as this list of points in the National Air Policy is the result of a composite idea, it is nevertheless true that until this has taken tangible form in the pages of AVIATION, no concrete air policy has been available. If AVIATION has laid a foundation for a discussion, it will feel amply compensated for the time and space it has devoted to this plan.

In another part of this issue will be found several letters from leaders in aviation fields that indicate that there is being developed the foundations of a National Air Policy that should receive the most earnest support of everyone in aeronautics.

A Suggested National Air Policy

That a National Aviation Policy is needed by the United States is obvious. To get such a policy in concrete form AVIATION *requested several thoughtful friends of aeronautical progress to make suggestive and constructive recommendations. Some of them are given below and will be printed each week with additions, omissions and such other changes as appear to be helpful toward the formulation of a sound national air policy. Readers of* AVIATION *and others can render no greater service to the cause of aeronautical progress than contributing their comments and suggestions.*

GOVERNMENTAL.

A continuing program of aircraft development both governmental and commercial.

A civilian, charged with championing a national air policy, is needed in the Government. **Cabinet*

Aircraft committees in the House and Senate to hold aircraft hearings where civilians as well as government officials can express their opinions. **composed of fliers.*

A detailed aircraft budget for all Governmental Departments, and an annual statement of all expenditures.

An experienced staff of flying officers at the head of all governmental air defense services.

Coordination of all procurement and experimental aircraft work of the government under one agency..

**Co-ordination of the aircraft experimental development of the government leaving procurement to the various branches themselves.*

Limitation of government manufacture to repair of aircraft and specialized work that cannot be done by private firms. **No limitation on experimental construction.*

The elimination of the duplication of aerial functions and facilities by government departments.

A country wide Air Mail system of trunk lines connecting the principal cities of the country. **Retirement law for air mail pilots.*

Establishment of a National Airway System through cooperation of the Federal Government with States and Cities. **A landing field in every large city.*

A national aircraft law that will regulate aviation, administered by practical pilots and experienced aeronautical engineers. **and federal air police.*

Membership of the United States in the International Convention for Air Navigation.

**Increased governmental appropriations for aerial development.*

COMMERCIAL AIRCRAFT OPERATION.

Creation of commercial air lines by private enterprise or government subsidy.

Encouragement of participation by private companies in aircraft races and competitions.

Encouragement of the training of pilots by civilian schools.

Creating an Esprit de Corps among flying men all over the country by frequent gatherings at aviation meets.

**Encouragement of safe and sane flying.*

INDUSTRIAL AIRCRAFT CONSTRUCTION.

Recognition that a sound aeronautical industry is a prime necessity of our National Defense.

An active industrial association that will coordinate the aircraft industry and defend it from attack.

Encouragement of the designing of new types of aircraft by manufacturers by allowing them to retain their proprietory rights.

Concentration of manufacturing firms on specialized types of army and navy aircraft.

Encouragement of research by constructors, universities and other agencies as well as by the government.

Encouragement of an annual design competition for commercial aircraft.

CIVILIAN.

A national aeronautical organization composed of public spirited citizens that will take a strong position of leadership on national aeronautical policy. **Unification of all aeronautical organizations into one national association with chapters in all cities and towns.*

An Annual Aviation Week during which the country will think of aerial progress. **52 such weeks.*

The formation of local aero clubs by fliers for the purpose of stimulating flying in all localities.

Encouraging the public to fly and patronize the air mail and transport facilities.

*Suggested changes.

DOPES

PIGMENTED DOPES
VARNISHES ENAMELS

»TITANINE«

Reg. Trade Mark

MADE BY

TITANINE, Inc.

UNION, UNION COUNTY, N. J.

Contractors to U. S. Government

TRADE HAMILTON MARK

Hispano Propellers

A Special Design of maximum efficiency for commercial flying at a special low price made possible by the great demand for our most popular seller. A few in stock for immediate delivery. Send your order "Via Air Mail."

HAMILTON AERO MFG. CO., MILWAUKEE, WIS.

USEFUL AERONAUTICAL BOOKS

Airplane Engine Encyclopedia
By Glenn D. Angle — $7.50

*

Aeronautical Rule Book
N.A.A. — $2.00

Sent post paid upon receipt of check or money order

GARDNER PUBLISHING COMPANY, Inc.
225 Fourth Ave. New York

AVIATION

The only American Aircraft Weekly
The oldest American Aircraft Magazine

WILL SERVE YOU BEST because it

—is published for those who understand and have a definite interest in aviation.

—covers the news first and more thoroughly.

—prints first and often exclusively descriptions of new aircraft.

—it is the only American publication in which the progress of aeronautics is covered each week.

—gives the greatest value of any aeronautical publication—52 issues for $4.00.

Start your subscription with the next issue.

AVIATION
225 Fourth Avenue
New York

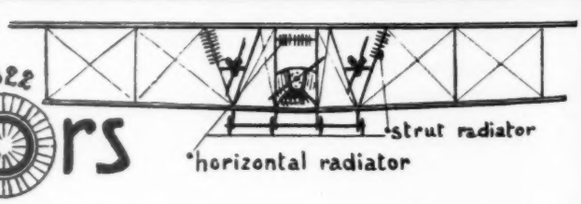
THE HIGHEST GRADE OF NEW FLYING BOATS OF HS2L TYPE ON THE MARKET

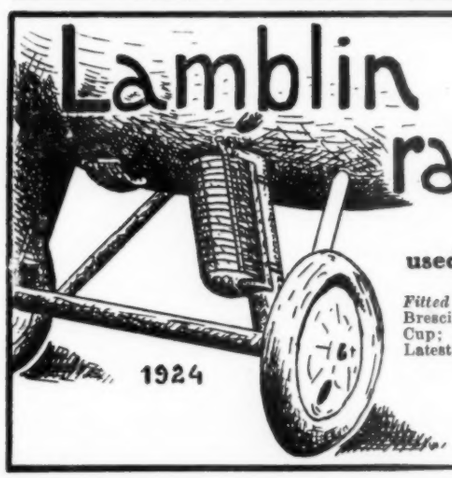
with or without power plant, completely assembled ready for flight, or packed in boxes ready for shipment, at our Baltimore warehouse
—Guaranteed 100% Complete—
For purchaser of unassembled boats, liberal space for assembly will be allowed free of charge
TERMS CAN BE ARRANGED
Write Department E
or
come down and look them over

AMERICAN AIRCRAFT INC.
BOX 104, STATION F BALTIMORE, MD.

Lamblin radiators

1922





used all over the world **on more than 10,000 aircraft**

Fitted to the winners of the following: Gordon Bennett Cup; Deutsch Cup, 1921; Circuit of Brescia; The Aerial Derby; Deutsch Cup, 1922; The British Speed Record; The Italian Grand Cup; Zenith Cup, 1923; Lamblin Cup; French Grand Prize for Transport Airplanes, 1923; Latest World's Altitude Record, Airplanes and Seaplanes, etc.

For particulars apply to

ETABLISSEMENTS LAMBLIN **36, BOULEVARD BOURDON, NEUILLY-SUR-SEINE, FRANCE**

The Aircraft Service Directory

WHERE TO PROCURE EQUIPMENT AND SERVICES

HAND FUEL PUMP

PIONEER INSTRUMENT COMPANY
MAIN OFFICE AND FACTORY BROOKLYN NEW YORK
WASHINGTON 441 STAR BUILDING — PARIS 97 BOULEVARD SAINT MICHEL — SAN FRANCISCO 15 SPEAR STREET

WRITE FOR PRICES ON COMPLETE UNITS OR PARTS FOR
CANUCK and JN planes
HS2L flying boats
OX5, OXX6 and Liberty motors
ERICSON AIRCRAFT LIMITED
120 KING ST. E. TORONTO, CANADA

We Carry a Large Stock of New and Used Airplanes, Motors and Supplies, and have on hand New JN4D's in original crates at $1,250; Used JN4D's in excellent condition all ready to take off, $850; OX5 Hammondsports complete, crated, $200; Canuck Uppers $50; New 26 x 4 Wheels $4.50; New 26 x 4 Casings $4.50; Slightly Used Casings $3; New Tubes $2; Altimeters, all makes, $6; Tachometers, all makes, $6; New JN4D Landing Gears, complete, $75; Copper Tipped Toothpick Propellers, $18; New JN4D Cowling, right $13, left $12; New Spark Plugs 25c, or in dozen lots $2.40; Sterling Silver Bar Pin with safety catch $1. Prompt service on orders.
WALLACE AERO CO., Bettendorf, Iowa

LUDINGTON EXHIBITION COMPANY
Sport Farman Ships
Aerial Taxi Service
Exhibition Flying
Office: 810 Atlantic Bldg. PHILADELPHIA — Flying from field of G. S. Ireland PINE VALLEY, N. J.

—PETREL MODEL FIVE—
—Super-Performance In the 3 Seater Class—
—Seaplane or Landplane to Suit Your desires—
—Air Cooled or Water Cooled Motors—
Details on Models Four & Five gladly furnished on request
HUFF DALAND AERO CORPORATION
OGDENSBURG, N. Y.

NEW HS2L FLYING BOATS
in original crates
AND MF BOATS
$600.00
GULF COAST AIRLINE
515 Whitney-Central Bldg. New Orleans, La.

FOR SALE—Two Loening Air Yachts (400 h.p. Liberty Motors)—one of these machines has flown 120 hours, price complete with electric starter, Four Thousand Dollars ($4000.00).
The other Air Yacht has only had about 30 hours of flying, and is in practically brand new condition; price Seven Thousand Dollars ($7000.00).
These machines are at present disassembled at Hangar, but on deposit of One Thousand Dollars ($1000.00) will be assembled and made ready to fly with all launching facilities, etc., available.
Address all inquiries to—New York-Newport Air Service, Inc., 31st Street and East River, New York City.

Airplanes, Flying Boats, Motors and Supplies. Parts for JN4D Canuck, J-1 Standard, OX5, OXX6 Hispano and Liberty. Fireworks:—Spectacular Night Plane Display $48.; Flash Bombs, good for day or night $4.; Flag Bombs $3.75; huge Smoke Trail $3.50. Non-shatterable Goggles:—NAK Wide-vision $4.85 or Jumbo $3.50. New 26 x 4 Cord Casing $4.; Slightly Used Casing $3.; Moderately Used $2.; New Tubes $2.; Altimeter $5. JN4D or J-1 Gas Tank Gauge $5.; Rotary Map Case—Rotate as Trip Progresses $3.50. JN4D Gas Tank with Gauge $15. Special:—150 H.P. Hispano Motored 3-place Standard, fair shape, $1050.
716 West Superior FLOYD J. LOGAN Cleveland, Ohio

New SEAGULLS $2600.00, New K6 ORIOLES $2200.00, New JN4Ds $1000.00, STANDARD without motor $600.00, Used STANDARD K6 three-seater $1500.00, Used JN4Ds $400.00 and up, Used OX5 motors $50.00 and up, New OX5 motors $175.00, Used K6 motors $250.00 and up, New K6 motors $1000.00.
Before purchasing spare parts get our prices.
G. S. IRELAND
CURTISS FLYING FIELD GARDEN CITY, N. Y.

PARAGON PROPELLERS
BETTER THAN EVER
American Propeller & Mf'g. Co.
Baltimore, Maryland

OX5 STANDARDS — $575.00
READY FOR DELIVERY: ASSEMBLED & TEST-FLOWN
STANDARD J-1 WINGS, CURTISS & LAWRENCE ENGINES;
COMPLETE STOCK OX5 PARTS, RADIATORS & ACCESSORIES
— WRITE FOR PRICE LISTS —
TIPS & SMITH
P. O. Box 153 (1505 Washington Ave.) HOUSTON, TEXAS

BATES LIGHT PLANE MOTORS
Again Available in New Super-Efficient Design
16 to 26 H.P. — 49 lbs. — 77 cu. ins. — $375.00
BATES ENGINEERING COMPANY
34 N. JEFFERSON ST. CHICAGO, ILL.

HAROLD EVANS HARTNEY
AVIATION CONSULTANT
528 Transportation Building
Washington, D. C.

OSTERGAARD AIRCRAFT WORKS
4269 N. Narragansett Ave. Chicago, Ill.
Finest guaranteed Acetate of Nitrate Dope per gallon $2.50, Goggles $3.00, Spark Plugs 25c, Spar Varnish $5.00 per gallon, Hantsch-Ostergaard Light motor, 36 lb., 12-15 h.p. $750.00. Blue print of 75 m.p.h. Aerodrive sled 50c, Sled complete $495.00
SPRUCE, ALUMINUM, STEEL, PLYWOOD
Everything for any aircraft *State specific needs*

AIRCRAFT SERVICE DIRECTORY
CONTINUED

COMMERCIAL AIRPLANES
THAT ARE PAYING PROPOSITIONS
Three and five place machines
Hiso motors and parts. Standard parts and equipment.
Write for catalog.
LINCOLN STANDARD AIRCRAFT CORP.
LINCOLN, NEBR.

New OX5 Standards throughout, test-flown $625.00. New Hisso Standards (except motors, which are practically new) $1250.00. New Standard wings, complete, struts, wires, tail surface, etc., f.o.b. cars $135.00. New Bosch Booster magnetos $10.00. Standard parts and spares reasonable. Dope, cotton fabric, general line of accessories and parts.
J. L. SCHROEDER
AEROPLANES, MOTORS and SUPPLIES
P.O. Box 380 HOUSTON, TEXAS
Assembly Plant No. 7700 Washington Ave.

LIBERTY "12" AVIATION ENGINE PARTS
ASSEMBLIES, SPECIAL EQUIPMENT AND TOOLS ARE CARRIED IN OUR STOCK ROOMS FOR IMMEDIATE DELIVERY
JOHNSON MOTOR PRODUCTS INC.
518-522 WEST 57TH STREET NEW YORK, N. Y., U. S. A.

Yackey Aircraft Co., 818 Desplaines Ave., Forest Park, Ill.
S.V.A. Dual control Liberty 6 motor, $1250.00. Used JN4-D, $350.00 and up. Used Canuck, $425.00 and up. Rebuilt Canucks, $700.00 and up. New Canuck, $1150.00. 39B Aeromarine Land or water, $575.00. C6 Standard, New wings overhauled motor, $1050.00. Lincoln Standard five placed fair condition, $1200.00. 4 placed DH9 less motor, new covers, $450.00. 3 placed Avroe 110 Le Rhone new, $950.00. 3 placed Laird OX5, good shape, $1275.00. TM Scouts without motor S4C new, $450.00. OX5 Yackey Sport 2 placed T.M., $1475.00. 5 placed Breguets, Renault motor, $4750.00. Parts for Avroes, T.M.'s Breguets, S.V.A.'s. New Shock cord guaranteed—Resistal Goggles. Write for new price list.

Army Surplus Airplanes and Supplies
Standard J1—OX5, OXX6, and Hispano 150 motored, $750. Curtiss JN4D—OX5 motored, new and used, $400. Avro and Thomas Morse Scouts, new and used.
Motors, Hispano 150, Hispano 220, Curtiss OX5 and OXX6.
Wings, single or sets—Standard, Curtiss JN4, or Canuck. Special bargain tail units; Curtiss JN4 and Canuck rudders, $4. Propellers, parts, dope, linen, tires, wheels, tubes—immediate shipment. Resistal goggles, $3; special price larger orders.
Price List on Request
Marvin A. Northrop, 200 Builders Exchange, Minneapolis, Minn.

BELLANCA
6 Seater with 90 hp. OX5
8 Seater with Hispano
2 Seater with motor cycle engine
COLUMBIA AIRCRAFT CORPORATION
FARMINGDALE, L. I., N. Y.

WRIGHT E-3 ENGINES
180-240 H. P.
SPECIAL OFFER
Due to an over run of parts for E-3 engines we can make a very attractive special price on this model of the Wright Hisso. This E-3 model ran 250 hours *full throttle* at 1800 r.p.m., pulling over 200 H. P. for practically the entire test, during which the valves were ground only once, at 125 hours. The test was continued for over 500 hours *full throttle*, with same bearings, crank, gears, rods and pumps. All remained perfect. Kelmet bearings and Thompson silcrome tulip valves are supplied on these E-3's, the same as on our latest models. We can equip these engines, without extra charge, with high compression pistons for racing and we will guarantee 240 H. P. but it can be expected that the engines will pull considerably above this guarantee. These are new engines and will be given the regular Government test schedule on our dynamometers before shipment.
WRIGHT AERONAUTICAL CORPORATION
PATERSON, N. J. U. S. A.

CLASSIFIED ADVERTISING

10 Cents a word, minimum charge $2.50, payable in advance. Address replies to box numbers, care AVIATION, 225 Fourth Ave., New York.

FOR SALE: Newly covered Jenny, A-1 condition. Motor fair condition, for immediate sale $500.00. Mac Headley, La Cross, Indiana.

FOR SALE: Liberty engines, brand new, with or without latest improvements. Box No. 302—AVIATION.

WANTED—Used Hisso motored three place Lincoln Standard, fair or good condition, give all details first letter. Box 270, Penn Ave., P. O. Station, Washington, D. C.

FOR SALE: Cheap, Liberty six super compression motor, perfect condition. R. H. Richart, 602 N. Court St., Sullivan, Ind.

Will exchange an absolutely new $2200.00 six passenger fast motorboat for a HS2L or MF flying boat. Ships must be new or slightly used only. Joseph Reglinski, 83 Lake St., Webster, Mass.

FOR SALE: Jenny OX5 Motor in A1 condition. Best offer for quick sale. A. T. Ambroz, 5422 S. Winchester Ave., Chicago, Ill. Phone Republic 7145.

FOR SALE: Standard 3 place with new Model I Hisso Plane in A-1 Condition. Attractive color. Write for particulars. O. E. (Dick) Evans, North Platte, Nebr.

Special this issue only for $7.50. Brand new Zenith, Meko or Taylor Altimeters, 3½ inch dial, 4½ inch over all, twenty thousand feet luminous dial (or twenty-five thousand), in original package, guaranteed, or you can return them our expense if not satisfied. They are easily worth twenty-five dollars. We will prepay postage anywhere in U. S. for this week only. Do not send us any orders after this issue, as we will positively refuse to fill them at this price, $7.50. Crawford Airplane Co., Venice, Calif.

FOR SALE—Apel built motor boat, Hall Scott, 45 miles per hour, fine shape. 2, 240 hp. Heiro motors, 2 150 hp. Rapp motors. Pusher and tractor propellers for Hisso, Clerget, 130 B.M.W. OXX6, new in original boxes. New MF Boats, used 39B seaplanes and parts, main pontoons, wing floats, control wire, turnbuckles, bolts, etc. Priced right. Essington School of Aviation, Essington, Pa.

TEXT BOOK OF AERONAUTICAL ENGINEERING
In two parts—309 Pages—146 Illustrations
By Lieut. Alexander Klemin
Price, postpaid: U. S. $5.00, foreign $5.25
THE GARDNER PUBLISHING CO., Inc.
225 Fourth Ave. New York

Anzani Aircraft Motors

Type 6A3 70/80 H.P. Dual Ignition

Other 1924 Types from 10 to 120 H.P. for commercial airplanes and moto-aviettes.

WALLACE KELLETT CO. INC.

Atlantic Building **Philadelphia.**

FOR SALE

HAMMONDSPORT CURTISS OXX6 MOTORS COMPLETE WITH TOOLS

Brand New—Immediate shipment in original crates

$250. each

F.o.b. Baltimore

Wire Orders Only a few left

HS2L FLYING BOATS

Brand New and in original crates immediate shipment—FOB Norfolk

Large Stock of Almost Anything You Require in Curtiss OX5 and OXX6 Spare Parts.

SOUTHLAND JOBBING HOUSE

P. O. Box No. 676 **NORFOLK, VA.**

INDEX TO ADVERTISERS

A

Aircraft Service Directory ..... 925 - 926
American Aircraft, Inc 924
American Propeller & Mfg. Co 925

B

Bates Engineering Co 925

C

Classified Advertising 926
Columbia Aircraft Corporation 926
Curtiss Aeroplane & Motor Co., Inc 928

E

Ericson Aircraft, Ltd 925

G

Gulf Coast Airline 925

H

Hamilton Aero Mfg. Co 924
Hartney, Harold Evans 925
Huff Daland Aero Corp 925

I

Ireland, G. S 925

J

Johnson Motor Products Co 926
Johnson Airplane & Supply Co 906

K

Kellett, Wallace Co., Inc ..... 907 - 927

L

Lamblin, Etablissements 924
Lincoln Standard Aircraft Corporation 926
Logan, Floyd J 925
Ludington Exhibition Co., Inc 925

M

Martin, The Glenn L., Co 906

N

Napier & Son, Ltd., D 921
New York - Newport Air Service, Inc 925
Northrop, Marvin A 926

O

Ostergaard Aircraft Works 925

P

Pioneer Instrument Co 925

S

Schroeder, J. L 926
Southland Jobbing House 927

T

Tips & Smith 925
Titanine, Inc 924

W

Wallace Aero Co 925
Where to Fly 920
Wright Aeronautical Corp ..... 908 - 926

Y

Yackey Aircraft Co 926

Curtiss

Speed with Safety

When the Army Air Service decided to demonstrate to the world the mobility of American aircraft, they chose a Curtiss product.

Lieutenant Maughan's recent flight from New York to San Francisco between the hours of dawn and dusk was accomplished in a Curtiss designed and built Pursuit plane equipped with a Curtiss D-12 motor and a Curtiss-Reed one-piece duralumin propeller.

This threefold combination is indeed hard to beat, as each one preeminently leads its field. The plane of Curtiss design includes all the essentials necessary for high speed racing and high performance military aircraft, among which are:

Extreme maneuverability with comfort and visibility to the pilot at all times;

Multispar cellular wings, with covering of spruce planking instead of fabric—shrapnel proof—no cloth covering to tear off;

Steel tubular fuselage with a readily detachable engine mounting;

Split axle type of landing chassis, in which shocks are absorbed by rubber discs acting in compression. This chassis, although but a few months old, has already been adopted as the standard type.

Quickly detachable wing or cellular radiators eliminating resistance heretofore required for cooling;

Oil temperature regulator, which permits instantaneous starting, even in the coldest weather, and then maintains the proper temperature of the oil while in flight.

The Curtiss D-12 motor, in addition to holding all the speed records of the world, now has to its credit Lieutenant Maughan's achievement. On account of the small frontal area of the D-12 for the first time the size of the pilot rather than the engine controls the size of the fuselage.

The Curtiss-Reed one-piece duralumin propeller, the safest and most efficient propeller ever tested, is unaffected by hail or rain, tall grass, small particles, age or climatic conditions. It too has done its part in winning these high speed and endurance tests.

The Curtiss Pursuit as a fighting unit has no competitor in the world. It has set new standards for plane, motor, and propeller.

CURTISS AEROPLANE & MOTOR COMPANY, Inc.

GARDEN CITY, L. I. **BUFFALO, N. Y,**